PAPERS READ.

DESCRIPTIONS OF TWO NEW SPECIES OF AUSTRALIAN MOLLUSCA.

By James C. Cox, M.D., F.L.S.

ANCYLUS SMITHI, sp.nov. (Pl. x1x., figs. 1-3).

Shell ovate, broadest in front, pale horny yellowish-green colour, translucent, limpet-shaped; striated concentrically from apex to circumference with curved lines of growth, the apex being the centre of the rays; striated longitudinally with striæ radiating from the apex in rather coarse ridges, which are for the most part rather widely separated, but are irregular in dis_ tance from each other, and if anything interrupted in their direct course, and are not quite straight. The lines are undoubtedly slightly waved. These can only be seen with a moderately high power. These striæ can be seen through the shell when the animal is removed.

The apex is bluntly rounded, inclined to the right, and the shell declines from it less abruptly in front than it does behind and at the sides, where it gradually tapers off, and is situated $3\frac{1}{4}$ millimètres from the anterior margin. The shell, looked at from the inside, shows the muscular impression, which is rather large and granular.

When the animal is in the shell a brownish colour is seen opposite the muscular impression.

Dimensions of full-grown shell-length 5; breadth (at anterior end) 3, (at posterior end) 2; height 1½ millimètres.

The living specimens of this Ancylus or River Limpet now described, and which were exhibited at the last meeting of the Society, were obtained by me from the Port Hacking River, National Park, about twenty miles south of Sydney, quite unexpectedly, and they have bred and multiplied themselves to a very arge number.

About nine months ago I lifted from the bed of the river, at its head, specimens of *Vallisneria* and other aquatic plants, to the roots of which I found wire worms (*Gordius* sp.) adhering in great numbers. Being anxious to observe the habits of life of these worms, I placed the plants in a fish globe by themselves and covered their roots with earth. A few weeks afterwards I was surprised to observe in the globe the presence of several specimens of Ancylus in a living state, and I had them carefully cared for. The result has been that there are now in the globe at least forty specimens. As a rule they reside at the bottom of the globe, or as high up in it as the earth covering the roots of the plants reaches, but a few are seen moving about a few inches higher up adhering to the glass.

A species of this genus has been described by Prof. Tate from North Australia and the River Torrens, Adelaide, as *Ancylus Australicus* (Trans. and Proc. Roy. Soc. South Australia, Vol. III. 1880, p. 102).

The genus Ancylus proper has its summit apex turned to the left. There are six sub-genera recognised under the genus—Ancylastrum, Acroloxus, Cumingia, Haldemania, Lanx, and Brondelia, but the only one I can recognise with a dextral apex is Ancylastrum.

As the shell which I now describe is undoubtedly dextral, I conclude that it belongs to this sub-genus.

CYPRÆA IRVINEANÆ, sp.nov. (Pl. XIX., figs. 7-9).

Shell umbilicated, oblong-ovate; pale cream-coloured, irregularly sparsely spotted with minute pale yellowish-red spots; these spots have as a rule a transverse elongated form very similar to Cypræa Coffea, Sowb.; subfasciate by depth of colour on the dorsal aspect, and crossed transversely by subangulate ridges which divide the dorsum into about six unequal parts. The dorsal surface is well elevated, the sides being steep; the right margin is crenately grooved from end to end, the left well grooved or sulcated in front and only slightly posteriorly, the

intermediate portion of the side being quite free from sulcation. The margin of the right side of the shell is blunt, well-defined, and everted, separating the dorsal and ventral surfaces, and runs forwards and backwards, joining the everted extremities. The teeth of the orifice, from 16 to 18 in number, are white, sharp, and prominent, but not coarse on the right side, and only extend about half-way across the right callous base; on the left the teeth, about 15 in number, are small and fine, scarcely extending at all across the left side of the base, but are seen as callosities dipping into the internal stoma.

The channel is well everted. There are no decided colour-markings on each side of it in front, merely a light brown coloration blotch, and a similar faint coloration blotch is noticeable on the sides of the posterior ends. There is a faint freckling of coloration along the everted edges of the sides within the sulcation of the margin; the rim margin is inclined to be tuberculously elevated. The interior of the shell is of a very pale flesh tint.

Length 25, breadth 14 millimètres.

Hab.—North-west coast of Australia.

Cypræa stolida, Linn., with its variety C. brevidentata, Sowb., and C. Coffea, with which this species would group, are found at the same locality, but it has such distinct differences as to justify its being made a new species.

I have named this shell after Mrs. J. F. Irvine, an enthusiastic conchological collector, who obtained it at Cape Naturaliste, in Western Australia, along with many other valuable species new to science

EXPLANATION OF PLATE.

Figs. 1-3.—Ancylus Smithi, $Cox (\times 6)$.

Fig. 4.—Caliaxis australis, Forbes; the animal.

Fig. 5.—Celiaxis australis, Forbes; animal and shell (enlarged).

Fig. 6.—Cæliaxis australis, Forbes; section.

Figs. 7-9.—Cypræa Irvineanæ, Cox.

Figs. 10-11.—Helix Howe-insulae, Cox.

Note.—Figures 4.6, and 10-11 refer to species to be treated of in a future paper.

REVISION OF THE GENUS HETERONYX, WITH DESCRIPTIONS OF NEW SPECIES.

BY THE REV. T. BLACKBURN, B.A., CORR. MEM. LINN. Soc. N.S. W.

PART IV.

The present memoir carries on my revision of Heteronyx to the end of the genus. In order to make this portion (Part IV.) of the work as far as possible complete in itself in respect of the species it deals with, I must remind the members of the Linnean Society that for the purpose of my work I have proposed to divide Heteronyx into 3 main divisions (or "Sections"), the 1st containing those species in which the labrum is altogether below the plane of the clypeus and invisible from above (as in most Melolonthidæ); the 3rd containing those species in which the labrum is dilated and directed upwards in such manner that its summit rises above the plane of the clypeus; and the 2nd containing species in which the relation of labrum and clypeus is intermediate between those indicated above. I have now to deal with the last part of the 3rd Section. I subdivided it into groups of species having 8-jointed antennæ (already dealt with), and those having 9-jointed antennæ. The latter of these groups I have subdivided according as the claws are bifid (already dealt with) or appendiculate. The present memoir deals with those species whose claws are of the last-named form.

In the course of a few months I hope to be able to offer to the Society an appendix treating of a number of species that have come into my hands during the issue of this "Revision" but too late to be included in the sections to which they belong, and also discussing those species previously described by other authors which I have failed to identify.

Tabulation of species of Section III., Group II., Sub-group II. (i.e., having the labrum overtopping the plane of the clypeus, the antennæ 9-jointed, and the claws appendiculate).

^{*} The characters of these species are derived from the published descriptions, types not having been examined by the author of the present memoir.

- B.*Suture between the metasternum and its episterna very evidently (say by at least \(\frac{1}{4} \) of its length) longer than the distance from the hind apex of that suture to the hind margin of the hind coxe.....
 - C. Puncturation of prothorax and elytra somewhat even,-or that of the former coarser and less close.....
 - D. Apical piece of hind claws considerably shorter than the basal piece.
 - E. Hind claws normal in length (i.e., at most little more than half as long as the rest of the claw joint.
 - F. Puncturation of prothorax not conspicuously coarser stronger than of elytra.....
 - G. Puncturation of elytra fine and squamose (colour ferruginous).
 - H. Posterior angles of prothorax quite rounded off..... vacuus, Blackb.
 - HH. Posterior angles of prothorax (from a certain point of view) appearing sharp and hindward directed.... simius, Blackb.

GG. Puncturation of elytra coarse and not squamose (colour dark ferruginous). rusticus, Blackb.

GGG. Puncturation of elytra coarse and squamose (colour black) nigrinus, Blackb.

^{*} The following species seems to oscillate between this and "BB,"lubricus, Blackb.

FF. Puncturation of prothorax conspicuously coarser and stronger	
than of elytra	oscillator, Blackb.
EE. Hind claws long (much more than half as long as the rest of the claw joint)	rapax, Blackb.
DD. Apical piece of hind claws little, or not, shorter than basal piece.	
E. Hind angles of prothorax quite rounded off	lubricus, Blackb.
EE. Hind angles of prothorax (at least from some point of view) well developed	
F. Prothorax with middle lobe of base scarcely indicated	montanus, Blackb.
FF. Prothorax with middle lobe of base well defined	concolor, Macl.
CC. Puncturation of prothorax (at any rate in front) much closer and finer than of elytra	
D. Puncturation of prothorax much closer and finer anteriorly than behind	Rothei, Blackb.
DD. Puncturation of prothorax close, fine, and even throughout	
BB. Suture between the metasternum and its episterna little, or not, longer than the distance from the hind apex of that suture to the hind margin of the hind coxe	
C. Puncturation, at least of prothorax and elytra, close, fine, and even	

(more or less after the manner of that of <i>H. piceus</i> , horridus, normalis, &c.)	
O.*Elytra without rows of setiferous granules,—at most a few such granules close to the base	
E. Inner apex of each elytron not bearing a conspicuous tuft of setæ	
F. Trilobed appearance of outline of head quite defined	
G. Basal joint of hind tarsi shorter than the 2nd joint	
H. Middle lobe of "trilobed outline" of head appears narrower than the lateral lobes.	
I. Puncturation of elytra very fine and close (evidently more so than in <i>H. piceus</i> , horridus and normalis)	
J. Species at least 5 lines long, —not of a distinctively "orange" colour	
K. Elytra much wider behind the middle than at the middle agrestis, Burm.	
KK. Elytra scarcely if at all wider behind the middle than at the middle scalptus, Blackb.	
JJ. Species about 4 lines long,	

—colour bright orange... doctus, Blackb.

^{*} Vide note on H. rhinastus (p. 689).

11. Puncturation of eight less	
fine and close (resembling	
that of H . $piceus$, $horridus$	
and normalis)	rhinastus, Blackb.
HH. Middle lobe of "trilobed out-	
line" of head appears wider	
than the lateral lobes	laminatus, Blackb.
GG. Basal joint of hind tarsi not	
shorter than the second joint.	subferrugineus, Burm
FF. Trilobed appearance of outline	
of head not from any point	
of view defined	neregrinus. Blackb.
	por ogretions, Establish
EE. Inner apex of each elytron bearing a conspicuous tuft of setæ.	alongatus Blanch
	eiongaias, Diancii.
DD. Elytra with rows of setiferous	
granules, especially a row along	
the suture	pustutosus, Diacko.
CC. Puncturation of prothorax and	
elytra very evidently less close,	
fine, and even than in the group	
"C"	
D. Trilobed outline of head with the	
middle lobe evidently more than	
half as wide as the lateral lobes.	
E. General colour more or less uniform,	
—some shade of ferruginous or	
testaceous	
F. Apical membrane of elytra not	
extraordinarily developed	
G. Hind coxe on the external mar-	
gin much shorter than the	
distance from their hind mar-	
gin to the hind margin of the	
3rd ventral segment	

H. Apical part of suture of elytra on either side keel-like,—the apex itself prominent or sub- spiniform longulus, Blackb.
HH. Suture of elytra very slightly convex,—at apex not at all produced or subspiniform
I. Colour of elytra dull brownish yellow without any ferru- ginous tone
II. Colour of elytra of a decidedly ferruginous tone angustus, Blackb
GG. Hind coxe on external margin scarcely if at all shorter than the distance from their hind margin to the hind margin of the 3rd ventral segment.
H. Basal joint of hind tarsi evidently longer than the 2nd joint scutatus, Macl.
HH. Basal joint of hind tarsi not longer than the 2nd joint. collaris, Blackb.
FF. Apical membrane of elytra extraordinarily developed posticalis, Blackb.
EE. General colour not uniform,— partly black or pitchy F. Upper surface with a velvety
appearance, and pruinose iridiventris, Blackb. FF. Upper surface glabrous (or nearly so) and nitid marginatus, Blackb.
D. Trilobed outline of head very well developed, with the middle not

D

- more than half as wide as the lateral lobes.....
- E. Prothorax feebly (at most) lobed hindward......
 - F. Prothorax considerably narrowed in front; elytra set with numerous long erect hairs among the adpressed pubescence...... vagans, Blackb.
 - FF. Prothorax very little narrowed in front; elytra not set with numerous long erect hairs ... mimus, Blackb.

H. DIMIDIATUS, Er.

I do not think that I have seen an example of this insect, which is said to occur in Tasmania, and is probably limited to that island. The following five species are all closely allied to it in having the anterior half or thereabouts of the upper surface clothed with long erect hairs, the head and prothorax ordinarily black or pitchy and the elytra usually ferruginous with more or less dark colouring in front, and the elevation of the labrum above the clypeus usually very slight. The greater part of Erichson's description would apply to nearly all the species known to me of this group, but it mentions one character which seems to differentiate dimidiatus strongly, viz., "fronte parce subtiliter punctata," as contrasted with "clypeo punctato-rugoso." No species that I have seen in the group shows any indication of this sculpture. As Erichson gives no exact description of the claws or of the relative length of the hind coxe and metasternum it is of course not certain that H. dimidiatus would fall in this group

(according to my arrangement) but it is hardly likely to differ in these respects from species evidently allied to it and themselves having these parts very uniform. It may be added that Erichson does not indicate the number of joints in the antennæ of H. dimidiatus except by implication in calling it a Silopa,—and he has certainly included some species with 8-jointed antennæ under the name, although in the generic diagnosis he calls the antennæ 9-jointed.

H. JUBATUS, sp.nov.

Minus elongatus; postice vix dilatatus; minus nitidus; pilis (antice longis erectis, postice brevioribus adpressis), sat dense vestitus; piceo-niger; palpis, elytris (basi minus late picea excepta), tarsisque, rufo-ferrugineis; abdomine tibiisque plus minus rufescentibus; capite crebre rugulose (clypeo parum subtilius crebrius), prothorace elytrisque crebre subtilius, pygidio leviter obscure, punctulatis; labro clypeum vix superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali parum longiori; coxis posticis metasterno manifeste, nec multo, brevioribus; elytris substriatis, interstitiis obsolete convexis.

[Long. 3, lat. 1½ lines.

Var. A. Pedibus plus minus testaceis, colore obscuro in elytrorum sutura et marginibus lateralibus plus minus producto.

Var. B. Elytris antice haud obscurioribus.

Var. C. Capite (palpis rufis exceptis) corporeque subtus antice, solis piceis.

The "trilobed" appearance of the front outline of the head is not well defined from any point of view as it is in itself very feeble, and viewed from the most favourable point is much concealed by the long erect hairs of the surface; its appearance from the most favorable point of view is that of a feeble bisinuate line bulging out feebly and very narrowly in the middle. The clypeus is strongly reflexed at the sides, very distinctly margined across the front, feebly concave in front, its sides scarcely angulated immediately in front of the eyes, its sculpture scarcely so coarse as

that of the rest of the head, which does not form an evenly continuous plane with it and is separated from it by a strongly impressed suture angulated in the middle and wavy towards the sides. The prothorax is half again as wide as long, its base half again as wide as its front which is sub-bisinuate with sharp feebly produced angles; its sides are feebly arched, and most divergent immediately in front of the base, its hind angles very feeble but appearing from a certain point of view not quite rounded off, its base feebly bisinuate but strongly lobed hindward all across, and still more in the middle (somewhat as in H. gracilipes, mihi). The elytra are very feebly and widely but somewhat uniformly costate (somewhat as in H. potens, mihi), their lateral fringe being normal and their apical membrane obsolete. The hind coxæ are much nearer the length of the metasternum (than which they are not much shorter) than of the 2nd ventral segment. The metasternum is punctured somewhat closely and evenly but not at all coarsely, and is clothed with very long hairs; the hind coxe are punctured unevenly (in parts very coarsely) and have an irregular antero-internal space smooth. The ventral segments are punctured somewhat coarsely at the sides, but neither closely nor deeply, the puncturation becoming more or less obsolete in the middle, where however some more or less conspicuous longitudinal impressions or scratches may be noticed on some of the segments. The ventral series are but little conspicuous. The hind femora are not much wider than the intermediate, their inner apical angle feeble but quite distinct. The lower two teeth on the anterior tibiæ are strong and sharp, the uppermost being less than half as large as the 2nd, the tibial outline straight from its base to the apex of the uppermost tooth. The hind claws (including the apical piece) are somewhat strongly compressed, their basal piece not much longer than the apical and having its inner apex but little produced. The whole undersurface is minutely coriaceous and therefore sub-opaque. The 2nd joint of the hind tarsi is half again as long as the 1st. Not closely resembling any of the preceding species, but perhaps nearest to H. potens and its allies. The puncturation of the upper surface is not unlike that of H. piceus,

Blanch. The punctures on the prothorax are spaced so that more than 20 averagely separated would range down the middle line.

It is not impossible that this is *H. striatipennis*, Blanch., (from Tasmania), but the expression "elytris profunde striatis" of that author would be so outrageously exaggerated if applied to this species that in the absence of Tasmanian examples I think it more likely that the two are distinct.

Apparently occurring, not rarely, all over Southern Australia; I have not seen examples from Western Australia, Queensland, or Tasmania.

H. HIRTUOSUS, sp.nov.

Minus elongatus; postice leviter dilatatus; sat nitidus; pilis fulvis antice longis curvatis erectis, postice minus longis depressis, sat dense vestitus; piceo-niger; antennis, palpis, pedibus, elytris, et abdominis apice, plus minus rufis; capite obscure crassissime vix fortiter, prothorace profunde sat crebre, elytris squamose sat crasse fortius nec crebre, pygidio fortius crebrius, punctulatis; labro elypeum vix superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali vix longiori; coxis posticis metasterno manifeste nec multo brevioribus; elytris vix striatis.

[Long. $2\frac{9}{5}$, lat. $1\frac{1}{5}$ lines.

Var. A. Prothorace, pedibus totis, et abdomine toto, ferrugineis.

Var. B. Elytris antice, et abdomine toto, piceis. (Long. 3_5^1 lines).

Var. C. Elytris totis (macula ferruginea obscura latera versus excepta), et abdomine toto, piceis. (Long. 3 lines).

The detailed description of *H. jubatus* is applicable to this species with the following exceptions;—the clypeal suture is less strongly angulated in the middle,—the prothorax is somewhat less than half again as wide as long and has more strongly rounded sides which reach their greatest divergence further from the base, the base moreover being less lobed hindward,—the elytra have no (or scarcely any) indication of striæ,—the hind coxæ are slightly

shorter in proportion to the metasternum and 2nd ventral segment,—the undersurface is not coriaceous and is therefore more nitid,—the puncturation of the metasternum is stronger and of the hind coxe less coarse,—the ventral segments are much more strongly punctured (especially in the middle). The hind tarsi are short as compared with those of the preceding and following species.

It will be seen by the Latin diagnosis that the whole upper surface is very much more strongly punctured than in *H. jubatus*. The punctures on the prothorax are spaced so that about 16 or 17 averagely separated would range down the middle line.

Also distributed widely in Southern Australia, but appears to be less common than $H.\ jubatus.$

H. fallax, sp.nov.

Minus elongatus; postice leviter dilatatus; sat nitidus; pilis antice longis erectis, postice suberectis sat brevibus, vestitus; piceo-niger; palpis, tibiis, tarsis, et elytris (parte antica excepta), ferrugineis; capite prothoraceque leviter sat crebre minus subtiliter, elytris (his obscure striatis) squamose sat crebre subrugulose, pygidio sparsim subtilius, punctulatis; labro clypeum vix superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali vix longiori; coxis posticis metasterno manifeste nec multo brevioribus. [Long. 2\frac{4}{5}, lat. 1\frac{2}{5} lines.

Very like *H. jubatus*, the detailed description of which will apply to this species subject to the following remarks: the trilobed appearance of the front outline of the head is quite obsolete from all points of view; owing to the very slight elevation of the labrum above the clypeus (it does not rise at all above the reflexed margin of the front of the latter) it is quite invisible unless inspected from a point whence the view is so little oblique that the apparent continuity of the outline of the labrum and clypeus is lost; there is no defined difference in sculpture between the clypeus and the rest of the head; the hind angles of the prothorax are completely

rounded off so that the sides become the base without any indication whatever from any point of view of any exact point where they do so; the base of the prothorax is not bisinuate and is evenly and strongly lobed hindward all across; the puncturation of the head and prothorax is scarcely coarser but a little less strongly impressed than in *H. jubatus*; the hind coxæ are less coarsely punctured; the ventral series are probably more conspicuous (in the example before me they are rubbed off and I judge only from the punctures that have borne them).

This is the insect which Sir William Macleay regards as H. dimidiatus, Er., but the puncturation of the head is not consistent with that determination; moreover Erichson says of the prothorax "angulis posterioribus obtusis," whereas in this species there are no angles at all.

N. S. Wales.

H. FRATERNUS, sp.nov.

Minus elongatus; postice vix dilatatus; minus nitidus; pilis (antice longis erectis, postice brevioribus adpressis) sat dense vestitus; piceo-niger; palpis, antennis, tarsis, elytrisque, rufo-testaceis; capite æqualiter rugulose sat crebre, prothorace et elytris confertim subtiliter, pygidio obscure, punctulatis; labro clypeum late sat fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali parum longiori; coxis posticis metasterno haud brevioribus.

[Long. $2\frac{3}{5}$, lat. $1\frac{2}{5}$ lines.

So closely allied to *H. jubatus* that the detailed description of that species may be taken as referring to the present one with the following qualifications;—the labrum is more prominent, and the sides of the clypeus are less reflexed and less produced forward so that in the "trilobed outline" of the head there is a very slight concavity between the lobes, and the appearance is rather that of a continuous curve much more strongly convex in the middle than at the sides, this more strongly convex piece (the middle lobe) being much more than half as wide as the lateral lobes. The puncturation of the upper surface is much finer and closer than in

H. jubatus, being indeed as fine and close as it well could be,—almost more so than in H. pustulosus, the elytra have scarcely a trace of striæ, the hind coxæ are distinctly longer than the metasternum, the hind femora are wider with their inner apical angle less marked, the longitudinal impressions on the ventral segments are wanting, and the undersurface is more shining.

A single example was taken near Port Lincoln by Mr J. Anderson.

H. vacuus, sp.nov.

Minus elongatus; postice leviter dilatatus; subnitidus; ferrugineus; pilis aureis adpressis minus crebre vestitus; clypeo crebre fortiter rugulose, capite postice paullo sparsius crassius (huic et illo pube densiori suberecta), prothorace subtiliter minus crebre, elytris subtiliter squamose, pygidio obscure (nonnullis exemplis fortius) punctulatis; labro clypeum late minus fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali sat longiori; coxis posticis metasterno sat brevioribus. [Long. $3\frac{2}{5}$, lat. $1\frac{4}{5}$ lines (vix).

The "trilobed" appearance of the head is not from any point of view very well defined owing to the slight convexity of the upper outline of the labrum, and the feeble emargination of the clypeus (which, however, is margined all across); hence the middle lobe appears much more than half as wide as the lateral ones, and all appear but little prominent. The clypeus is fairly distinct from the rest of the head, with a feebly arched suture and puncturation evidently closer and less coarse. The prothorax is slightly more than half again as wide as long, the base slightly more than half again as wide as the front which is only moderately concave, with angles sharp but not very prominent; the sides are strongly rounded, the hind angles quite rounded off, the base only feebly bisinuate but rather strongly lobed hindward. The elytra are punctured somewhat as in H. punctipennis and Mulwalensis, but decidedly less closely than in either; their puncturation is very much closer, finer, and more squamose than in H. aphodioides; their lateral fringe is normal, their apical membrane distinct.

The hind coxe are a little longer than the 2nd ventral segment and are punctured sparingly and strongly but with a defined antero-internal space levigate, their postero-external angle rounded off. The metasternum is punctured externally rather closely but less strongly, in the middle more strongly and less closely. puncturation of the ventral segments is well defined but not close, especially in the middle; the ventral series consist of fine hairs and are obscure. The hind femora are not much wider than the intermediate, their inner apical angle feebly defined. The three external teeth of the front tibiæ are sharp and well defined, the uppermost hardly half as large as the middle one, the tibial outline from its base to the apex of the uppermost tooth being straight. The basal piece of the hind claws is sharply but very minutely toothed at its apex, and is a good deal longer than the apical piece. The pygidium in the type is rather roughly punctured and feebly carinate down the hind part of the middle; in other examples this sculpture seems much enfeebled.

Princetown (Victoria); taken by Mr. T. G. Sloane.

H. simius, sp.nov.

Minus elongatus; postice leviter dilatatus; sat nitidus; ferrugineus, antennis testaceis; pilis fulvis sat brevibus adpressis sparsim vestitus; capite crebre sat crasse, prothorace postice sat (antice magis etiam) crebre subtiliter, elytris crebre minus subtiliter squamose, pygidio (hoc exempli typici longitudinaliter carinato) fortius sparsim, punctulatis; labro clypeum late leviter superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali multo longiori; coxis posticis metasterno sat brevioribus.

[Long. 3\frac{1}{5}, lat. 2 lines.

The "trilobed" appearance of the head is scarcely defined; the front face of the labrum is more strongly concave than in most species of the genus, owing to which, when the front outline of the head is viewed from the point most favourable for observing a "trilobed" appearance, the outline of the middle lobe appears truncate (or almost concave); besides which the lateral lobes are

so feebly reflexed that the distinction of one lobe from another is almost lost. In most other respects very like *H. vacuus*, but with the following distinctions;—the front angles of the prothorax are less advanced, and the hind angles are from some points of view sharply rectangular or subacute (in *vacuus* they appear quite rounded off from all points of view), the base is strongly bisinuate, the surface is a little more closely punctulate, and the puncturation of the elytra is deeper and more conspicuous.

N. S. Wales; in the collection of Sir William Macleay.

H. RUSTICUS, sp.nov.

Minus elongatus; postice leviter dilatatus; subnitidus; ferrugineo-piceus, antennis palpisque testaceis; pilis aureis vestitus (his exemplo typico plerisque evulsis); capite crasse rugulose, prothorace elytrisque subæqualiter fortius nec crebre, pygidio inæqualiter, punctulatis; clypeo labrum late leviter superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali parum longiori, apice subfortiter producta; coxis posticis metasterno paullo brevioribus.

[Long. $3\frac{4}{5}$, lat. 2 lines (vix).

The description of the head in the detailed description of *H. vacuus* may be taken as applying to this insect also. The prothorax is nearly twice as wide as long, its base not quite half again as wide as its front which is only very feebly concave, with very small angles; the sides are gently arched, the hind angles scarcely distinct from any point of view, the base rather distinctly bilobed. The puncturation of the elytra scarcely differs from that of the prothorax except in being a little closer; there is scarcely a trace even of a sutural stria or of any transverse wrinkling; the lateral fringe is normal, the apical membrane distinct. The description of the underside in *H. vacuus* may be applied to this species except that the metasternum is exceptionally short, (being not much longer than the hind coxæ, and suggesting a doubt whether this species might not find its place better among species having the hind coxæ elongated), and that the ventral

series are well defined, consisting of stout fulvous hairs. The hind femora are a good deal wider than the intermediate, their inner apical angle being scarcely distinct. The three external teeth of the front tibie are strong but rather blunt, the uppermost small, the tibial outline from its base to the apex of the uppermost tooth is straight. The apical piece of the hind claws is not very much shorter than the basal which is distinctly produced at the apex, but its produced apex is much smaller than half the apical piece.

Apart from colour this species bears much resemblance to *H. sparsus* (from the same locality) but it is a more robust, larger insect, with the puncturation (especially on the prothorax) larger, shallower, and less sparing, and the produced apex of the basal piece of the hind claws much smaller.

N. Territory of S. Australia; taken by Dr. Bovill.

H. nigrinus, sp.nov.

Minus elongatus; postice vix dilatatus; sat nitidus; niger, antennis palpisque testaceis, pedibus plus minus piceis; pilis albidis brevibus minus dense vestitus; clypeo crasse rugulose, capite postice crasse minus crebre, prothorace paullo minus crasse sub-crebre, elytris crassius squamose, pygidio obsolete (hoc longinaliter carinato nonnullis exemplis rufescenti) punctulatis; labro clypeum late minus fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali sat longiori; coxis posticis metasterno sat brevioribus.

[Long. 3 (vix), lat. $1\frac{2}{5}$ lines.

The structure and sculpture of the head do not differ in any noticeable manner from those of the preceding two species. The detailed description of the prothorax of *H. vacuus* will apply to this species, but the puncturation is very evidently coarser. The elytra are punctured slightly more coarsely and closely than the prothorax, with a somewhat squamose appearance and a good deal of transverse wrinkling,—especially towards the sides; they have no defined striation; their lateral fringe is normal and their apical membrane narrow but distinct. The hind coxe and metasternum

do not differ perceptibly from those of *H. vacuus*, except in the former (together with the ventral segments) being very finely coriaceous and therefore less nitid. The ventral segments bear at the sides well defined but not close puncturation, their middle part being almost without defined punctures but more strongly coriaceous. The description of the legs of *H. vacuus* may be applied to this insect.

Apart from colour differences *H. nigrinus* resembles *H. vacuus*, but is on the upper surface very much more coarsely punctulate, and on the underside coriaceous and much less nitid.

A larger specimen (long. $3\frac{3}{5}$ lines) does not seem to differ except in respect of size.

Neighbourhood of Adelaide.

H. OSCILLATOR, sp.nov.

Minus elongatus; postice vix dilatatus; minus nitidus; obscure ferrugineus, antennis palpisque testaceis; pilis fulvis elongatis adpressis (hic illic in capite nonnullis erectis) vestitus; capite crasse rugulose nec crebre, prothorace fortiter sat crebre, elytris subtilius squamose crebre, pygidio (hoc subtiliter coriaceo) sparsim obsolete, punctulatis; labro clypeum late minus fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali multo longiori; coxis posticis metasterno sat brevioribus. [Long. 3, lat. 1½ lines-

This species is extremely close to *H. nigrinus* and the whole of the detailed description (above) of that species may be applied to it, so far as is consistent with the Latin diagnosis. The following are the principal differences between the two: in oscillator the clypeal suture is less distinct, the prothorax is more strongly and closely punctured, the elytra are very much more closely, finely, and squamosely punctured (their puncturation resembling that in *H. punctipennis* and *Mulwalensis*, without being quite so fine and close as in those species) and the basal piece of the hind claws is larger in proportion to the apical piece with its apex less decidedly

produced into a sharp tooth. The example before me, moreover, is less nitid than *H. nigrinus* and of a different colour.

N. Territory of S. Australia; taken by Dr. Bovill.

H. RAPAX, sp.nov.

Minus elongatus; postice dilatatus; subnitidus; ferrugineus, antennis palpisque testaceis; pilis sparsis fulvis adpressis parum perspicue vestitus; elypeo crebre rugulose, capite postice prothorace elytris (his transversim rugatis, longitudinaliter vix perspicue costatis) et pygidio multo minus crebre, fortius punctulatis; labro elypeum sat fortiter sat anguste superanti; antennis 9-articulatis; unguiculis elongatis appendiculatis, unguiculorum posticorum parte basali apicali multo longiori; coxis posticis metasterno sat brevioribus. [Long. $4\frac{4}{5}$, lat. $2\frac{1}{2}$ lines.

The trilobed appearance of the outline of the head is fairly well defined, the middle lobe being about as long, and rather more than half as wide, as the lateral ones, -none of them however being very prominent. The clypeus is roundly and moderately concave across the front and finely margined all across, -- its surface coarsely and closely but not deeply rugulose, punctulate,—its suture feebly angulated in the middle, and carinated except in the middle part (if this be a constant character it is highly distinctive), its plane scarcely distinct from that of the rest of the head which is punctured (like the prothorax) smoothly, rather closely and not deeply. The prothorax is very nearly twice as wide as long, its base not quite half again as wide as its front which is somewhat deeply concave with angles well produced but not very sharp; the sides are gently arched, the base strongly bisinuate but not much lobed hindward in the middle, the hind angles rounded. The elytra are punctured a little more closely and coarsely than the prothorax and somewhat squamosely, their transverse wrinkling is rather conspicuous, their sculpture becomes evidently finer and feebler towards the apex, their lateral fringe is normal, their apical membrane scarcely indicated. The hind coxæ are considerably shorter than the metasternum and much longer than the 2nd



ventral segment, their postero-external corner sharply rectangular, they and the metasternum being punctured rather closely and not very strongly on the sides, -much more sparingly and strongly towards the middle, the former with a distinct smooth anterointernal space. The ventral segments are punctured a little more finely than, and about as closely as, the sides of the metasternum but their sculpture is a little feebler and less close in the middle; the ventral series consist of fine hairs but are fairly conspicuous. The hind femora are not much wider than the intermediate, their inner apical angle feebly defined. The three external teeth of the anterior tibiæ are wide and sharp but not very long, the uppermost being less than half as large as the intermediate, the tibial outline from its base to the apex of the uppermost tooth being straight. The hind claws are exceptionally long, the basal piece being quite twice as long as the apical and having its apex produced in a distinct process, which however is less than half as large as the apical piece. The basal joint of the hind tarsi is not much more than half as long as the 2nd joint.

Victoria (?); taken by Mr. T. G. Sloane.

H. LUBRICUS, sp.nov.

Sat elongatus; postice vix dilatatus; nitidus; ferrugineus, antennis testaceis; pilis fulvis (exemplo typico forsitan abraso sparsissime) vestitus; clypeo crasse subcrebre, capite postice prothorace pygidioque subtilius sparsim, elytris (his transversim perspicue rugatis) fortius sat crebre, punctulatis; labro clypeum sat fortiter late superanti; antennis 9-articulatis; unguiculis elongatis appendiculatis, unguiculorum posticorum parte basali apicali parum longiori; coxis posticis metasterno sat brevioribus.

[Long. 3_5^1 lat. 1_5^2 lines.

The trilobed appearance of the outline of the head is very feebly defined owing to the slight convexity of the upper edge of the labrum which makes the latter appear (unless viewed from very far back) as a wide truncate projection from the front; viewed from very far back (i.e. very obliquely, almost along the surface of

the head) the middle lobe appears slightly longer, and scarcely narrower than the lateral lobes. The clypeus is scarcely emarginate and scarcely margined across the front, its plane scarcely distinct from that of the rest of the head, its suture very fine and inconspicuous, its sides diverging from the front quite to the eyes. The prothorax is about three quarters again as wide as long, its base not much more than a quarter again as wide as its front which is very slightly emarginate, and slightly advanced in the middle, with very feeble angles; the sides are rather strongly rounded, the base not bisinuate but rather strongly convex hindward all across, the hind angles quite rounded off so that the exact limits of the base are not indicated. The elytra have a fairly defined sutural stria and obscure traces of several other striæ (probably quite obsolete in some examples); their transverse wrinkling is fairly conspicuous, their lateral fringe normal, their apical membrane obsolete. The hind coxe are a little shorter than the metasternum, but distinctly nearer its length than that of the 2nd ventral segment; they and the metasternum are punctured somewhat coarsely but neither closely nor deeply on the sides, the former being quite and the latter nearly lavigate towards the middle line of the body. The ventral segments are very sparsely punctured,—finely in the middle, less so at the sides; the ventral series consist of moderately stout hairs. The hind femora are moderately wider than the intermediate, their inner apical angle rounded and feeble. The lower two teeth of the anterior tibiæ are strong and sharp, the uppermost very small (very much less than half as large as the intermediate), the tibial outline from its base to the apex of the uppermost tooth being straight. The hind claws are long, the basal piece very little longer than the apical, and sharp but scarcely produced at its inner apex.

Port Lincoln.

H. MONTANUS, sp.nov.

Minus elongatus; postice leviter dilatatus; sat nitidus; ferrugineus, antennis testaceis; pilis fulvis sat brevibus adpressis sparsim vestitus; clypeo crebre crasse rugulose, capite postice

fortiter sat sparsim, prothorace minus fortiter subcrebre, elytris fortius subcrebre, pygidio minus fortiter minus crebre, punctulatis; labro clypeum late sat fortiter superanti; antennis 9-articulatis; unguiculis sat elongatis appendiculatis, unguiculorum posticorum parte basali apicali parum longiori, fortiter compressa; coxis posticis metasterno sat brevioribus; prothorace canaliculato.

[Long. 4, lat. 2 lines.

The "trilobed" appearance of the head is fairly well defined, the middle lobe as long, and nearly as wide, as the lateral lobes. The clypeus is only feebly emarginate and is finely margined all across, its plane not continuous with that of the rest of the head, its suture well marked and widely angulated. The prothorax is $\frac{3}{5}$ again as wide as long, its base $\frac{3}{5}$ again as wide as its front which is somewhat deeply concave with well produced sharp angles; the sides are nearly straight; the base is distinctly bisinuate with the middle scarcely lobed hindward; the hind angles are from some points of view almost sharply rectangular. The elytra have no trace of striæ, their transverse wrinkling is little noticeable, their lateral fringe normal, their apical membrane distinct. The hind coxæ are about intermediate in length between the metasternum and 2nd ventral segment; they, the metasternum, and the ventral segments are punctured somewhat strongly and closely at the sides and more sparsely towards the middle, the hind coxe having a well-defined lævigate antero-internal space. The ventral series consist of fine hairs and are very inconspicuous. The hind femora are not very much wider than the intermediate, their inner apical angle being scarcely defined. The external teeth of the front tibiæ are as in H. lubricus except that the uppermost is not quite so small in proportion to the others. The strongly compressed basal piece of the hind claws is a conspicuous character.

Blue Mountains, N.S.W.; sent by Mr. T. G. Sloane.

H. CONCOLOR, Macl.

I have before me two examples of an insect sent to me under this name by Mr. T. G. Sloane, who states that they were taken in Queensland. They appear to tally very well with the brief description given by Sir W. Macleay (Trans. Ent. Soc. N.S.W., II. p. 196) except in being somewhat larger (long. $3\frac{1}{5}$, lat. $1\frac{3}{5}$ lines). Unfortunately they have both lost their hind claws, but from an inspection of the other claws I have little doubt that the hind ones are appendiculate with the basal piece strongly compressed and not much longer than the apical piece.

The species is extremely close to *H. montanus* but differs from it as follows:—it is smaller, its colour is paler, the puncturation is evidently finer and closer throughout, the trilobed appearance of the front outline of the head is very feeble owing to the slight reflexion of the sides of the clypeus, the prothorax is decidedly more transverse (nearly twice as wide as long) with its base scarcely half again as wide as its front (the former being widely and very distinctly convex hindward, or lobed, in the middle).

H. Rother, sp.nov.

Minus elongatus; postice leviter dilatatus; sat nitidus; ferrugineus, antennis testaceis; pilis erectis minus brevibus sparsim vestitus; capite antice crebre rugulose postice paullo sparsius vix rugulose, prothorace antice subtiliter crebre postice crassius minus crebre, elytris sparsius fortiter sat squamose, pygidio fortius subcrebre, punctulatis; labro clypeum fortiter minus late superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali sat longiori, sat fortiter compressa; coxis posticis metasterno sat brevioribus.

[Long. $3\frac{3}{5}$, lat. $1\frac{4}{5}$ lines.

The "trilobed" appearance of the front of the head is exceptionally well defined, the middle lobe appearing as long and a little more than half as wide as the lateral lobes. The clypeus is gently concave across the front, with a fine continuous margin, its plane not continuous with that of the rest of the head, its suture very feebly and widely angulated, its sides converging hindward abruptly and strongly close in front of the eyes, so that their outline is there angulated. The prothorax is $\frac{3}{4}$ again as wide as

long, its base a little less than half again as wide as its front which is widely and not very strongly concave, with sharp moderately prominent angles; the sides are gently arched; the base is gently bisinuate and strongly lobed hindward; the hind angles are exceptionally well defined. The elytra have little or no trace of striation; their transverse wrinkling is ill defined, their lateral fringe normal, their apical membrane obsolete. The description of the underside and legs of H. montanus, Blackb., may be read as applying to this species, with the following exceptions:-the lævigate space on the hind coxæ is unusually large, the puncturation of the ventral segments is feeble at the sides and obsolete in the middle, the inner apical angle of the hind femora though much rounded is distinctly prominent, the apical piece of the hind claws is smaller and the uppermost tooth on the anterior tibiæ is very much larger in proportion to the others, being much more than half as large as the intermediate one; a very distinct species; the puncturation of the front of the prothorax much finer and closer than on any other part of the surface together with the exceptionally large uppermost tooth on the front tibiæ will characterize it strongly among its allies. The elytral sculpture is of a decidedly coarse type resembling more or less that of H. nigellus, auricomus, piger, &c., &c.

Sedan, S.A.; taken by Mr. Röthe.

H. PUNCTICOLLIS, sp.nov.

Minus elongatus; postice sat dilatatus; sat nitidus; ferrugineus, antennis testaceis; pilis minutis adpressis obscure sparsim vestitus; capite crebre rugulose, prothorace crebre subtiliter, elytris multo fortius sparsius, pygidio subtilius valde sparsim, punctulatis; labro clypeum fortius nec late superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali sat longiori apice breviter producta; coxis posticis metasterno sat brevioribus. [Long. $3\frac{1}{5}$, lat. $2\frac{1}{5}$ lines.

The "trilobed" appearance of the head is almost as in the preceding species, but the lobes do not appear quite so prominent.

The clypeus is nearly on a continuous plane with the rest of the head from which it is separated by a well marked angulated suture, its outline angulated just in front of the eyes. The prothorax is not quite \(\frac{3}{4}\) again as wide as long and slightly more than half again as wide as its front which is widely and gently concave, very slightly bisinuate, and has sharp but little prominent front angles; its sides are somewhat strongly rounded immediately behind the middle, its hind angles exceptionally well defined and almost rectangular; its base is scarcely bisinuate, but somewhat strongly convex hindward in outline; in both the examples before me there is a small distinct round impression of a dark colour on either side near the lateral margin a little behind the middle. The elytra are almost or quite without trace of striation; their transverse wrinkling is feeble, their lateral fringe normal, their apical membrane scarcely visible. The hind coxe are not much longer than the second ventral segment; they and the metasternum are punctured rather closely but not very strongly,-the puncturation being somewhat even over the whole surface. The puncturation of the ventral segments is feeble and lightly impressed (especially in the middle) but not fine; the ventral series consist of long hairs and are fairly conspicuous. The hind femora are moderately wider than the intermediate, their whole undersurface (i.e., the surface not in contact with the body) being very evenly though not closely punctulate, and their inner apical angle moderately defined though very blunt. The front tibiæ are toothed like those of H. lubricus, but with the uppermost tooth even more minute still in proportion to the others.

This is another very distinct species, exceptionally broad behind,—with the relative puncturation of the prothorax and elytra, and the even puncturation of the undersurface (including the hind femora) most unusual among its congeners.

Victoria; taken by Mr. T. G. Sloane.

H. PUSTULOSUS, sp.nov.

Minus elongatus; postice leviter dilatatus; minus nitidus; pilis brevibus adpressis vestitus; setis longis erectis (in tuberculis parvis positis) in prothorace elytrisque sparsim instructus; obscure ferrugineus, palpis antennisque testaceis; confertim subtiliter (clypeo sat rugulose pygidio a basi gradatim minus crebre) punctulatus; labro clypeum sat fortiter sat late superanti; antennis 9-articulatis; unguiculis appendiculatis: unguiculorum posticorum parte basali apicali haud longiori; coxis posticis metasterno haud brevioribus. [Long. $6-7\frac{4}{5}$, lat. $3\frac{2}{5}-4$ lines.

Var. Corpore toto (antennis palpisque testaceis exceptis) piceo vel piceo-nigro.

The "trilobed outline" of the front of the head is well defined, the middle lobe slightly longer than, and decidedly more than half as wide as, the lateral lobes. The clypeus is rather strongly reflexed at the sides, not margined across the front, moderately concave in front, its sides slightly convergent hindward immediately in front of the eyes but not at all angulated, its sculpture a little more coarse and rugulose than that of the rest of the head which does not form a continuous surface with it, and is separated from it by a somewhat wavy suture. The prothorax is not quite $\frac{3}{4}$ again as wide as long, its base rather more than half again as wide as its front which is moderately concave, with front angles sharp but not very much produced; its sides are gently arched, and most divergent close to the base; the hind angles are (from some points of view) not quite non-existent but they are much rounded; its base is decidedly bisinuate, and narrowly but not strongly lobed hindward in the middle. The elytra are very obsoletely costate, the lateral fringe normal, their apical membrane distinct, their transverse wrinkling fine and minute but distinct, their puncturation a little finer and closer than in H. normalis. The hind coxæ are very fully as long as the metasternum; both are lightly, closely and rather evenly squamose-punctulate, the former with a very small antero-internal lævigate space, the latter with numerous scattered granules. The ventral segments are punctured like the hind coxe but less closely,—the middle part more finely than the sides. The ventral series are very conspicuous and consist of stout bristles. The hind femora are very much wider than the intermediate, their inner apical angle obtuse but fairly defined.

The lower two teeth on the front tibiæ are strong but not sharp, the uppermost much less than half as large as the 2nd, the tibial outline straight from its base to the apex of the uppermost tooth. The hind claws are strongly compressed, their basal piece not longer than the apical and having its inner apex sharply produced in a tooth. The erect setæ on the upper surface are placed (each on a small tubercle) along the front margin of the prothorax, a very small number on the sides of the disc of the same, and in rows down some of the obsolete costæ of the elytra,—especially the 1st, 3rd, and 10th.

Very like *H. normalis*, Blackb., but at once distinguished by 9-jointed antennæ, tuberculated surface, slightly feebler puncturation, &c., &c.

Apparently common in S. Australia. Mr. McDougall of Moonta states that he has seen it "swarming round tea-tree." I have seen examples from Port Lincoln, Yorke's Peninsula, Adelaide, Bordertown, Kangaroo Island.

H. ELONGATUS, Blanch.

This insect is so close to the preceding that it will be sufficient to state in what respects the above description must be modified to make it apply to the present species. The form is more elongate, and less dilated behind (long. $6\frac{2}{5}$, lat. $3\frac{1}{10}$ lines); there are no rows of setiferous tubercles running down the elytra; the clypeus is overtopped considerably less widely by the labrum so that the middle lobe of the "trilobed outline" appears to be not more than half as wide as the lateral lobes; the clypeus and rest of the head more nearly form a continuous even surface, and the sutural margin of each elytron ends in a dense cluster of strong spine-like bristles. A few long setæ are to be found on the elytra close to the base.

[It should be noted that I have examined only a single specimen (Q) of this species, which was taken by Sir William Macleay in N. S. Wales, and sent to me by him as H. elongatus, Blanch. It agrees very well with Blanchard's description. It is possible that the

clusters of bristles at the apex of the elytra may not be found in the male,—but I think unlikely. There is no trace of anything of the kind in either sex of the allied species].

H. AGRESTIS, Burm.

So excessively close to *H. elongatus*, Blanch., that I am unable to specify any tangible distinction except the absence in this species of the cluster of bristles at the apex of each elytron; the relation of the labrum and clypeus,—the portion of the former overtopping the latter being here quite as wide as, and even more prominent than, in *H. pustulosus*; and the general form,—*H. agrestis* being (not less elongate but) more dilated behind the middle of the elytra.

W. Australia. I possess an example from Port Darwin which I hesitate to distinguish from *H. agrestis*, though it is decidedly less dilated behind than any Western Australian specimen that I have seen. It differs from *H. scalptus* in the much wider middle lobe of the "trilobed outline" of the head.

H. RHINASTUS, sp.nov.

Sat elongatus; postice vix dilatatus; minus nitidus; piceoniger, antennis palpisque testaceis, pedibus obscure rufo-piceis; pilis brevibus adpressis albidis minus crebre vestitus; pilis longis erectis (præter series marginales) trans prothoracis elytrorumque marginem anticam instructus; confertim sat subtiliter (clypeo subrugulose) punctulatus; labro clypeum anguste fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali haud longiori; coxis posticis metasterno vix brevioribus. [Long. 5¹/₅, lat. 2³/₅ lines.

Extremely like the darkly coloured examples of *H. pustulosus* in general appearance, but seems to be invariably smaller. From that species and all the preceding species that follow it, *H. rhinastus* differs in the relation and structure of the labrum and clypeus, owing to which the "trilobed outline" of the head is exceptionally well defined,—the middle lobe appearing very

decidedly longer than, and not at all more than half as wide as, the lateral lobes. The longitudinal series of setiferous granules on the elytra, so marked a character in *H. pustulosus*, are quite wanting here, and the general form is less robust, scarcely dilated behind, legs more slender, external teeth of the front tibiæ a little sharper, prothorax narrower in front, puncturation less fine and close.

A dark red specimen in my collection (locality uncertain) seems to be this species, but it is too much broken for certain identification. I suspect most of the species of this group vary in colour.

S. Australia; Adelaide district, Kangaroo Island, &c.

N.B.—Among a large number of specimens of this insect examined by me I have found one example belonging to Sir William Macleay which has some feeble indications of pustules down the elytra close to the suture. I have not seen any example of *H. pustulosus* in which the pustules are not quite well defined there and in other rows on the elytra. The two species are very distinct by several other characters, and I think the example of *rhinastus* bearing the pustules must be regarded as quite abnormal.

H. SCALPTUS, sp.nov.

Sat elongatus; postice vix dilatatus; minus nitidus; testaceus, capite prothoraceque rufescentibus; pilis brevibus adpressis albidis minus crebre vestitus; pilis longis erectis (præter series marginales) trans prothoracis elytrorumque marginem anticam instructus; confertim subtiliter (clypeo subrugulose) punctulatus; elytris (certo adspectu) subtiliter confertim rugatis vix punctulatis; labro clypeum anguste fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali haud longiori; coxis posticis metasterno vix brevioribus.

[Long. 5\frac{5}{5}, lat. 2\frac{3}{5} lines.

Nearest to *H. rhinastus*, I think, but differing widely by the much closer puncturation of the elytra which do not appear

distinctly "punctured" so much as "closely wrinkled transversely;" the prothorax is a little more strongly transverse than in *rhinastus*, the tarsi are shorter and more slender, and the colour of the unique example before me is entirely different; in other respects I do not observe any noteworthy distinction between the two. The narrowly and very strongly elevated labrum together with the absence of rows of setiferous granules and of an apical pencil of setæ from the elytra will distinguish it from *H. pustulosus* and *elongatus*, while the exceptionally well defined "trilobed" appearance of the outline of the head, with the middle lobe prominent, and not more than half as wide as the lateral lobes, will prevent the confusion with it of any other of its allies. The basal joint of the hind tarsi is decidedly shorter than the 2nd.

Mulwala, N.S.W.; taken by Mr. T. G. Sloane.

H. LAMINATUS, sp.nov.

Minus elongatus; postice leviter dilatatus; minus nitidus; brunneo-testaceus, tibiis tarsisque sub-infuscatis; supra crebre subtilius sat æqualiter (pygidio minus crebre excepto) punctulatus; pilis brevibus adpressis crebrius vestitus; labro clypeum latissime sat fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicalpaullo longiori, apice vix dentata; coxis posticis metasterno haud brevioribus.

[Long. 3\frac{3}{5}, lat. 2 lines (vix).

Almost, if not quite, unique in the genus by the great development of the labrum which causes the middle lobe of the "trii lobed outline" of the head to appear decidedly wider, and much longer than the lateral lobes. Its place is evidently near H. pustulosus, from which (apart from size, the relation of labrum and clypeus to each other, and the absence of setiferous pustules), it differs as follows: the clypeus is less emarginate in front, and more nearly on an even plane with the rest of the head; the clypeal suture is distinctly carinate; the prothorax is more than $\frac{3}{4}$ again as wide as long and is more rounded laterally with anterior angles less produced and base scarcely at all lobed hindward

in the middle; the elytra show no traces of costæ; the hind coxæ are scarcely so long; the metasternum is not granulate; the lævigate space on the hind coxæ is much larger, the puncturation of the under surface is less close throughout; the lower two teeth on the front tibiæ are extremely sharp; the basal joint of the hind tarsi is but little shorter than the 2nd, and the hind claws are feeble with the apical piece shorter and the basal piece scarcely produced in a tooth at its apex.

Sedan, S.A.; taken by Mr. B. S. Röthe.

H. SUBFERRUGINEUS, Burm.

I feel some hesitation in this identification on account of the following discrepancies:—Dr. Burmeister says that subferrugineus is "aureopubescens," and speaks of the lateral fringe of the prothorax as much shorter than that of the elytra, neither of which characters do I notice in the specimens before me. The pubescence is very silky as it should be, but is whitish and pruinose rather than golden, and the lateral fringe is very uniform. In all other respects, however, (including several notable characters) the agreement is so satisfactory that I think it better to use the name. The colour of the insect decidedly has an orange or golden tone quite unusual in the genus, but it belongs to the derm, not the pubescence. The following description will furnish some particulars not mentioned by Dr. Burmeister.

Very strongly convex (more so than is usual in the genus), also unusually elongate and at its widest very little behind the middle of the elytra; the colour a pale orange or golden brown, the head, prothorax and legs more reddish in some examples. The surface is thinly clothed with short adpressed whitish-grey hairs, and in some lights has a distinctly pruinose appearance. The "trilobed outline" of the head is fairly defined,—the middle lobe being, however, very evidently longer, and scarcely narrower, than the lateral lobes. The front of the clypeus very feebly concave; its surface forms an almost perfectly even plane with that of the rest of the head from which it is separated by an obscure suture



scarcely angulated in the middle. The prothorax is all but twice as wide as long, the widest part (the base is quite undefined, owing to the hind angles being completely rounded off) is not quite half again as wide as the front which is feebly concave with angles neither much produced nor particularly acute; the sides are strongly rounded, widest immediately behind the middle; the base is feebly trisinuate, the middle hardly perceptibly lobed hindward. The elytra bear some faint suggestions of striæ; their transverse wrinkling is not noticeable, their lateral fringe is normal, their apical membrane obscure. The whole upper surface appears to be of a velvety texture which with the pubescence entirely conceals the sculpture,-but in an abraded example it is seen that the puncturation of the prothorax, elytra and pygidium is faint, fine and close, and that of the head stronger but scarcely closer (the clypeus, however, being closely, but by no means coarsely, rugulose). The underside is very like that of H. pustulosus, but the following differences should be noted: the entire surface has a slight silky lustre (most conspicuous on the hind coxæ),-the metasternum is not granulated,—the puncturation of all parts is a little finer and less close,—the ventral series consist of long, stout, yellow hairs, and seem more conspicuous in an example of equal freshness. The hind femora are not so much wider than the intermediate as in H. pustulosus, the apical piece of the hind claws is shorter in proportion to the basal, and the uppermost tooth of the front tibiæ is considerably smaller in proportion to the lower teeth. The tarsi also are longer and more slender, the 2nd joint of the hind tarsi scarcely as long as the basal joint. The antennæ are 9-jointed. [Long. $3\frac{2}{5}$ -5, lat. $1\frac{3}{5}$ - $2\frac{2}{5}$ lines.

W. Australia.

H. DOCTUS, sp.nov.

Sat elongatus; postice leviter dilatatus; minus nitidus; rufo ferrugineus fere aurantiacus; pilis minus brevibus adpressis albidis subtilius vestitus; corpore vix perspicue (nisi sub lente forti) punctulato; labro clypeum sat fortiter sat late superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali vix longiori; coxis posticis metasterno haud brevioribus. [Long. $4-4\frac{3}{5}$, lat. 2 (vix)- $2\frac{1}{5}$ lines.

This species is so closely allied to the preceding that it will be sufficient to mention the differences. The middle lobe of the "trilobed outline" does not appear much more than half as wide as the lateral lobes, and is strongly convex in outline. The prothorax is evidently less than twice as wide as long (by measurement about $\frac{4}{5}$ again as wide as long), the basal piece of the hind claws is shorter in proportion to the apical piece, and the 2nd joint of the hind tarsi is very distinctly longer than the basal joint.

S. Australia; apparently rare,—I have seen only two examples.

H. PEREGRINUS, sp.nov.

Sat elongatus; postice leviter dilatatus; minus nitidus; ferrugineus, antennis palpisque testaceis; pilis minus brevibus adpressis sat dense vestitus; subtiliter crebre (clypeo subtiliter ruguloso) punctulatus; labro clypeum (hoc antice fere truncato) late sat fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali sat longiori; coxis posticis metasterno haud brevioribus.

[Long. $3\frac{2}{5}$, lat. $1\frac{3}{5}$ lines.

Owing to the very slight concavity of the front of the clypeus and the width of the erect part of the labrum, the front outline of the head does not appear distinctly trilobed from any point of view, but from the most favourable point it appears as a feebly bisinuate curve the middle part of which is suddenly much more convex than the lateral portions, this middle part (which represents the middle lobe of the "trilobed outline") being not much narrower than the lateral portions. The plane of the clypeus is evenly continuous with that of the rest of the head, the clypeal suture being faint and nearly straight. The prothorax is almost $\frac{3}{4}$ again as wide as long, its base being only about a quarter again

as wide as its front, which is feebly concave with angles sharp but feebly produced; its sides are gently arched and most divergent scarcely behind the middle, its hind angles quite rounded off (from all points of view); its base is gently bisinuate and very feebly and widely lobed hindward in the middle. The elytra have feeble indications of several striæ (especially a sutural one), their transverse wrinkling is not apparent; their lateral fringe is normal, their apical membrane distinct. The underside and legs scarcely differ from the same in *H. pustulosus* except as follows:—the metasternum is not granulate, the teeth on the front tibiæ are sharper, and the basal piece of the hind claws is longer in proportion to the apical piece.

This species differs little in puncturation from *H. pustulosus*, elongatus, and agrestis, but it has a little of the velvety texture and pruinose aspect of the insect I take to be *H. subferrugineus*. Apart from size it differs from them all in the structure of the head; from *H. proxima*, Burm., (another nearly allied species) it differs inter alia by its much smaller size, and distinct apical membrane of the elytra; it also resembles *H. bidentatus*, Blackb., differing inter alia in the structure of the claws and the very evidently finer and closer puncturation of the elytra.

W. Australia; sent by E. Meyrick, Esq.

H. vagans, sp.nov.

Minus elongatus; postice leviter dilatatus; subnitidus; ferrugineus, antennis palpisque dilutioribus; pilis brevibus adpressis et longis erectis minus dense vestitus; capite (clypeo magis crebre excepto) prothoraceque sat crasse minus crebre, elytris squamose sat crasse sat crebre, pygidio (hoc opaco coriaceo) obscure, punctulatis; labro clypeum fortiter peranguste superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali sat longiori; coxis posticis metasterno vix brevioribus.

[Long. 4\frac{3}{5}, lat. 2\frac{2}{5} lines.

The "trilobed outline" of the front of the head is exceptionally well defined, the middle lobe appearing to be slightly longer than, and about a quarter of the width of, the lateral lobes. The clypeus is well reflexed at the sides, arcuately and somewhat strongly emarginate in front, and margined all across, its sides convergent hindward at their extreme base, its sculpture a little closer but not coarser than that of the rest of the head with which it does not form a continuous surface, the suture being well marked, angulated in the middle and sinuous on either side. The prothorax is nearly ³/₄ again as wide as long, its base about half again as wide as its front margin which is strongly emarginate, with sharp well produced angles (from some points of view it has a bisinuate appearance); its sides are slightly arched being almost at their widest at the base; its hind angles are seen to be much rounded off when the true margin is examined, but from some points of view they appear sharp and slightly produced hindward; the punctures of the surface are rather coarse and spaced so that about 16 of average distance would lie longitudinally down the middle line; the base is distinctly bisinuate, the middle lobe moderate. transverse wrinkling of the elytra is moderately conspicuous from some points of view, their lateral fringe normal, their apical membrane narrow but distinct. The hind coxæ are scarcely shorter than the metasternum, both being rather deeply punctured, somewhat finely and closely at the sides but more coarsely and sparingly towards the middle, the former having a well defined lævigate antero-internal space near which its puncturation is very coarse indeed. The puncturation of the ventral segments resembles that of the metasternum but does not become so coarse in the middle. The ventral series consist of stout short bristles. The hind femora are moderately wider than the intermediate, their surface being much punctured and their inner apical angle but little defined. The lower two teeth on the front tibia are long and robust but not very sharp, the uppermost well defined but less than half as large as the 2nd. The 2nd joint of the hind tarsi is exceptionally long as compared with the basal one; the hind claws are robust,

the basal piece much longer than the apical and having its inner apex produced in a short sharp tooth.

Widely distributed; I have seen specimens from Queensland, N.S.W., Victoria, and S. Australia, among which I find no variation likely to indicate specific distinction. The colour is in some examples more or less pitchy. *H. pubescens*, Macl., is probably identical, but the name is pre-occupied by Erichson for a Tasmanian species which would fall in my Section I.

H. MIMUS, sp.nov.

Sat elongatus; postice vix dilatatus; subnitidus; ferrugineus, antennis palpisque testaceis; pilis brevibus adpressis sat dense vestitus; capite prothoraceque sat crasse minus crebre, elytris squamose sat crasse sat crebre, pygidio sparsius minus crasse, punctulatis; labro clypeum fortiter peranguste superanti; antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali sat longiori; coxis posticis metasterno vix brevioribus.

[Long. 4½, lat. 2½ lines (vix).

Very near H. vagans, from which it differs in being a little more elongate, and less dilated behind the middle,—in the considerably more quadrate prothorax which is nearly $\frac{4}{5}$ again as wide as long and is not more than $\frac{1}{3}$ again as wide at the base as in front and has its hind angles more rounded off,—in the absence of erect hairs on the upper surface mixed among the general pubescence,—in the greater uniformity of sculpture on the head,—and in the much more distinct puncturation of the pygidium.

W. Australia; sent to me by E. Meyrick, Esq.

H. FLAVUS, Sp. nov.

Sat elongatus; postice leviter dilatatus; minus nitidus; flavobrunneus, capite prothoraceque sub-rufescentibus; pilis minus brevibus vix depressis sat sparsim vestitus; subtilius minus sparsim (clypeo crasse rugulose) punctulatus; labro clypeum late sat fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis, fortiter compressis, unguiculorum posticorum parte basali apicali paullo longiori; coxis posticis metasterno paullo brevioribus.

[Long. 3\frac{3}{5}, lat. 1\frac{4}{5} lines.

The outline of the front of the head is at most very feebly "trilobed" from any point of view, owing to the width and prominence of the labrum, on account of which the lobes are feebly distinguished one from another, the middle lobe however projecting further forward than, and appearing fully as wide as, the lateral ones. The labrum is well raised above the clypeus, which is exceptionally declivous in its front part, is feebly concave in front, is margined all across, and forms an almost even plane with the rest of the head, from which it is separated by a somewhat sinuous suture. The prothorax is a little more than half again as wide as long, its base scarcely a third again as wide as its front, which is slightly emarginate, with feeble rounded angles; its sides are moderately rounded, being at their greatest divergence in the middle; its hind angles viewed from above appear very little marked and not at all directed hindward, but not quite rounded off; its basal outline is scarcely bisinuate, but rather strongly convex hindward all across; its surface is not closely punctured, but nevertheless (owing to the fineness of the punctures) about 20 at average distance apart would run down the middle line, which shows some faint indication of a longitudinal channel. The elytra are punctured almost as the prothorax; they bear scarcely a trace of striation (except the sutural stria), their transverse wrinkling is fine and feeble, their lateral fringe normal, their apical membrane distinct but very narrow. The hind coxe are distinctly (but not much) shorter than the metasternum, both being punctured rather coarsely (especially the former) but not very deeply, rather closely at the sides and much more finely towards the middle, the former having an ill-defined lævigate antero-internal space. The puncturation of the ventral segments is fine, squamose, and somewhat even, but

not at all close; the ventral series consist of stout hairs springing from small granules and are very conspicuous. The hind femora are moderately wider than the intermediate, and have their inner apical angle scarcely marked. The lower two teeth of the anterior tibiæ are robust and sharp, the uppermost is all but obsolete, its place being indicated by a mere nick on the tibial outline. The inner apex of the basal piece of the hind claws is feebly produced in a kind of tooth.

This species is undoubtedly allied in many respects to the *H. vacuus* group, from which its hind coxæ (considerably longer on the external margin in proportion to the length of the metasternum) will at once distinguish it. I think it is a somewhat isolated form. Its pale yellowish-brown colour is peculiar and apparently constant.

Mulwala, N.S.W.; taken by Mr. T. G. Sloane.

H. Longulus, sp.nov.

Elongatus; postice vix dilatatus; subnitidus; flavo-ferrugineus, pilis brevibus adpressis minus sparsim vestitus; clypeo crasse rugulose, capite prothoraceque subtiliter sat crebre, elytris pygidioque minus subtiliter minus crebre, punctulatis; labro clypeum late sat fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali parum longiori; coxis posticis metasterno vix brevioribus.

[Long. 3-4, lat. $1\frac{2}{5}$ - $1\frac{4}{5}$ lines.

Apart from colour and puncturation this species bears so much resemblance to *H. subferrugineus* and *doctus* that the description of the former of these species may be taken to apply to the present one subject to the following remarks:—the colour is ferruginous (a little more yellowish than is common in the genus, but not at all "orange" in tone), and there is no velvety pruinose or iridescent appearance whatever; the elytra are a little more dilated behind the middle; the convexity of the body is not

noticeably greater than is usual in the genus; the middle lobe of the "trilobed outline" of the head is scarcely so much longer than the lateral lobes; the front of the clypeus is evidently declivous; the prothorax is not so transverse being not quite three quarters again as wide as long, the base being gently but almost evenly and continuously convex hindward, the middle however presenting on careful inspection a very slight sinuation or concavity; the elytra are evidently wrinkled transversely; the under surface is nitid and moderately strongly but not closely punctured (much more coarsely and sparsely than in the species of the pustulosus type), the hind coxæ having a small but distinct antero-internal lævigate space. The ventral series consist of hairs and are not very conspicuous. The entire puncturation of the upper surface is very manifestly stronger, coarser, and less close; that of the elytra being coarser than, and that of the prothorax very similar to, the same in H. flavus. The present species also resembles H. flavus, but it is more nitid and of a decidedly ferruginous tone of colour, with the clypeus wide in front as well as with the elytra differently punctured as just noted. The elytra have the suture somewhat elevated, and becoming keel-like near the apex, the apex itself being prominent, almost spiniform.

S.A.; I have seen it only from the Adelaide district.

H. ANGUSTUS, sp.nov.

H. longulo valde affinis; differt prothorace ad latera minus rotundato, lateribus basin versus minus convergentibus, angulis posticis (superne visis) sat minus rotundatis; elytris minus fortiter punctulatis, sutura minus convexa apicem versus haud carinata, apice suturali nullo modo spiniformi. [Long. 4¹₅, lat. 2 lines.

So extremely close to *II. longulus* that it would be useless to repeat the Latin diagnosis in full, but I am convinced that it represents a distinct species. I do not observe any differences beyond those mentioned above except that the two examples before me are a trifle larger than any *H. longulus* I have seen, and of a some-

what paler colour, and that the middle of the base of the prothorax is quite evenly convex hindward. The difference in the form of the suture of the elytra near, and at, the apex renders the two quite easy to distinguish. The ventral series of hairs seem a little more conspicuous than in H. longulus. Compared with H. flavus the size is very evidently greater and the elytra are evidently longer and less dilated hindward, with puncturation less close and fine; their colour also has a ferruginous reddish tone that is entirely wanting in those of H. flavus of which I have seen many examples but no varieties in this respect.

S. Australia; Victor Harbour and Kangaroo Island.

H. POSTICALIS, sp.nov.

Sat elongatus, postice vix dilatatus; subnitidus; ferrugineus, antennis palpisque testaceis; pilis brevibus adpressis minus sparsim vestitus; clypeo crasse rugulose, capite prothorace pygidioque crebrius minus fortiter, elytris crebrius squamose minus fortiter, punctulatis; labro clypeum minus late minus fortiter superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali paullo longiori; coxis posticis metasterno vix brevioribus; elytrorum membrana apicali valde producta.

[Long. 3\frac{3}{5}, lat. 1\frac{1}{5} lines.

The "trilobed" appearance of the head is feeble, all the lobes being little developed, the middle lobe as long and little more than half as wide, as the lateral lobes. The clypeus is rather strongly concave in front, and is margined all across; it almost forms an evenly continuous surface with the rest of the head, from which it is separated by a feeble suture. The prothorax is half again as wide as long, its base not quite half again as wide as its front which is rather strongly emarginate, with sharp well-produced angles; its sides are gently arched, and have their greatest divergence a little behind the middle; the hind angles viewed from above do not appear so entirely rounded off as they are seen

to be in reality when inspected from the side; the base is scarcely bisinuate but is rather decidedly lobed hindward; the puncturation is spaced so that scarcely 20 punctures of average distance could be placed in a line down the middle. The elytra are punctured not very differently from the prothorax but squamosely and a trifle more coarsely, whence the puncturation appears a little closer; they bear scarcely a trace of striation except the sutural striæ; the transverse wrinkling is somewhat conspicuous from some points of view and their lateral fringe is normal; the apical membrane is very strongly developed projecting hindward from the apex of the elytra in a wide riband-like band which is widest at the suture where it projects almost as far as the length of one of the hind claws. The hind coxe are decidedly (but not much) shorter than the metasternum, both being punctured somewhat coarsely, rather closely at the sides and much more sparingly towards the middle, the former having a small well-defined levigate antero-internal space. The puncturation of the ventral segments is lightly impressed and sparse, but fairly even; the ventral series consist of fine hairs and are very inconspicuous. The hind femora are not much wider than the intermediate, their inner apical angle being feeble. The teeth of the anterior tibiæ are robust and sharp, the uppermost less than half as large as the second. 'The inner apex of the basal piece of the hind claws is scarcely produced in a tooth.

The exceptional development of the apical membrane of the elytra is quite invariable in the moderately numerous series before me.

S. Australia; in the Adelaide district; on Eucalyptus leaves.

H. collaris, sp.nov.

Sat elongatus; postice vix dilatatus; subnitidus; obscure ferrugineus, antennis palpisque testaceis; pilis adpressis minus brevibus minus sparsim vestitus; capite (clypeo crasse rugulose excepto) sparsius fortius, prothorace crebrius minus fortiter, elytris crebre

subtilius, pygidio leviter sparsim, punctulatis; antennis 9-articulatis; labro clypeum late sat fortiter superanti; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali sat longiori; coxis posticis metasterno haud brevioribus.

[Long. $2\frac{4}{5}$, lat. $1\frac{2}{5}$ lines.

The outline of the head does not from any point of view present a distinctly "trilobed" appearance; as in H. peregrinus, from the most favourable point it appears as a continuous curve the convexity of which is much stronger in the middle than at the sides. There are some long erect hairs on the head and the front of the prothorax. The clypeus is almost truncate in front, its surface evenly continuous with that of the rest of the head from which it is separated by a well marked angulated suture. The prothorax is nearly \(\frac{3}{4} \) again as wide as long, its base (which is wider than the base of the elytra) less than \frac{1}{3} again as wide as the front, which is somewhat bisinuate with moderately sharp but not strongly produced angles; its sides are gently rounded; its hind angles fairly marked from some points of view though not at all sharp nor directed hindward; its base is rather narrowly, but not strongly, lobed in the middle, the puncturation is spaced so that about 20 punctures of average distance apart could be placed in a line down the middle. The elytra have a fairly distinct sutural stria but scarcely any indication of other striæ; their transverse wrinkling is somewhat conspicuous, their lateral fringe normal, their apical membrane scarcely distinct. The hind coxæ are a trifle longer than the metasternum, both being strongly punctured even in the middle, but not very closely, the former having a scarcely defined lævigate antero-internal space. puncturation of the ventral segments is sparse and feeble; the ventral series consist of stout hairs and are conspicuous. The hind coxæ are a good deal wider than the intermediate, their inner apical angle being fairly well defined. The teeth of the

anterior tibiæ are robust but not very sharp, the uppermost less than half as large as the intermediate. The inner apex of the basal piece of the hind claws is produced in a well defined sharp tooth which however is much less than half as large as the apical piece.

Adelaide.

H. MARGINATUS, sp.nov.

Sat elongatus; postice leviter dilatatus; sat nitidus; rufus, antennis palpisque testaceis, elytris abdomineque olivaceo-piceis (hoc apice rufo, illis latera versus rufescentibus) prothorace piceo-umbrato; subglaber (fimbriis usitatis exceptis); capite (elypeo crasse rugulose excepto) fortius sparsissime, prothorace fortius sat sparsim, elytris fortiter sat sparsim, pygidio (hoc pilis nonnullis vestito) leviter sat crasse, punctulatis; antennis 9-articulatis; labro elypeum vix superanti; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali parum longiori; coxis posticis metasterno haud brevioribus. [Long. 3½, lat. 1½ lines.

The labrum does not rise above the general plane of the clypeus but (owing to the strong anterior declivity of the latter) it overtops the front of the same; it is one of a few species that seem to hover a little doubtfully between my "main sections" II. and III., of the genus, but I place it in Section III. because from a certain point of view the "trilobed outline" of the head appears fairly well defined, having the lobes equal inter se in length and breadth; in other respects the structure of the head resembles that of H. collaris. The prothorax is scarcely more than half again as wide as long, the base being about $\frac{1}{3}$ again as wide as the front which is bisinuate, with blunt scarcely produced angles; the sides are moderately rounded, the hind angles (from all points of view) though obtuse yet quite well defined and scarcely at all rounded off; the base is gently bisinuate and feebly

lobed hindward in the middle; the puncturation is spaced so that about 17 or 18 punctures of average distance apart could be placed in a line down the middle. The elytra resemble those of *H. collaris* (except in their much coarser puncturation, their scarcely appearing transversely wrinkled from any point of view, and the apical membrane being better developed). The puncturation and structure of the legs and underside scarcely seem to differ from that of *collaris* except as follows:—the hind coxe are scarcely so long, the general puncturation is more enfeebled towards the middle of the body, the inner apical angle of the hind femora is less marked, the uppermost tooth on the front tibia is feebler, and the basal piece of the claws is considerably less produced in a tooth.

In some respects must be near H. rufomarginatus, Blanch., but I cannot regard it as that insect because inter alia it differs from the description as follows:—it is much smaller (H. rufomarginatus should be $4\frac{1}{2}$ -5 lines), and not pubescent (I do not think the example before me is abraded), and its prothorax is distinctly narrower (not "wider") than the elytra.

Endeavour River; in the collection of Sir W. Macleay.

H. IRIDIVENTRIS, sp.nov.

Minus elongatus; postice haud dilatatus; minus nitidus; niger, subtus plus minus iridescens; antennis palpisque testaceis; elytris rubidis; pedibus rufo-testaceis; supra (fimbriis solitis exceptis) fere glaber; subtus sparsim pilosus; obsolete sat sparsim (clypeo crebre rugulose excepto) punctulatus; labro clypeum sat leviter sat late superanti; antennis 9-articulatis; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali sat longiori, apice breviter acute dentata; coxis posticis metasterno vix brevioribus.

[Long. 3²₅, lat. 1⁴₅ lines.

Var. A. Elytris pedibusque obscurioribus.

Var. B. (? immat.) Subtus cum capite plus minus rufescens.

The "trilobed outline" of the front of the head is fairly welldefined—the middle lobe appearing about as long, and about half as wide, as the lateral lobe. The labrum rises only moderately above the surface of the clypeus, the front of which is feebly emarginate and scarcely margined continuously; the surface of the clypeus is scarcely distinct from that of the rest of the head, even the suture being feeble; the sides of the clypeus are almost parallel immediately in front of the eyes and then become convergent forward; there are a few long erect hairs on the head. The prothorax is nearly half again as wide as long, its base nearly half again as wide as its front, which is moderately emarginate, with sharp somewhat produced angles; its sides are strongly rounded, their greatest divergence being behind the middle; its hind angles are completely rounded off; its basal outline is scarcely bisinuate but is rather strongly convex hindward all across; its puncturation is not unlike that of the same part in H. flavus, but seems a little less close and more lightly impressed. The elytra have scarcely a trace of even a sutural stria; their puncturation differs little from that of the prothorax, but is coarser and less close; they are almost devoid of transverse wrinkling; the lateral fringe is normal, the apical membrane obsolete. The hind coxe are scarcely, if at all, shorter than the metasternum. The whole undersurface is punctured somewhat evenly, faintly and sparingly, the punctures on the metathorax being somewhat squamose-granulate. The ventral series are well-defined, consisting of stout pale hairs. The hind femora are much wider than the intermediate, their inner apical angle being very feeble. The lower two teeth of the anterior tibiæ are robust and very sharp; the uppermost, though sharp and well-defined, is

quite small (much less than half as large as the intermediate). The hind claws are long and slender, their basal piece considerably longer than the apical, and having a well-defined tooth at its inner apex—which, however, is very much less than half the size of the apical piece of the claw.

An extremely distinct species, conspicuous for its velvety appearance—strongly pruinose in some lights—the iridescence of its undersurface, and its faint rather large puncturation, a tout ensemble reminding one of Liparetrus discipennis, Guêr., and its allies. The deep crimson-copper colour of the elytra in ordinary specimens is also remarkable, some indication of that tinge persisting in even the darkest specimens I have seen.

Port Lincoln, also Yorke's Peninsula; a specimen belonging to Sir W. Macleay is said to be from King George's Sound.

NOTES ON AUSTRALIAN COLEOPTERA, WITH DESCRIPTIONS OF NEW SPECIES.

By the Rev. T. Blackburn, B.A., Corr. Mem. Linn. Soc. N.S.W.

PART IV.

The following notes and descriptions of new genera and species are directly or indirectly the outcome of examining a small collection of *Carabidæ* together with a few *Longicornes* sent to me by Mr. W. D. Randall from Barrow's Creek in Southern tropical Australia, and—from collections recently received from Central Australia (Mr. Wild) and the Northern Territory (Dr. and Mrs. Bovill)—such species as are connected with those Mr. Randall sent. I deeply regret to mention that Dr. and Mrs. Bovill have now left Australia and so put an end to their valuable and highly intelligent explorations.

LEBIIDES.

PHLŒOCARABUS.

I have several species in my collection which appear to belong to this genus. The characters given by Sir William Macleay in the "Insects of Gayndah" (Trans. Ent. Soc. N.S.W. II. p. 85) distinguish it satisfactorily from all other Australian genera of Lebiidæ yet described, and the species before me present all the characters specified very satisfactorily. In all of them the head is rather strongly dilated laterally behind the eyes (as in Xanthophæa) which causes the part of the head immediately in front of the neck to be wider than in some allied forms. No doubt this is what Sir W. Macleay refers to when he says "head suddenly narrowed behind the eyes into a distinct neck." The claws are simple.

[While this memoir has been in the printer's hands I have received from Mr. T. G. Sloane, of Sydney, the information that having (in compliance with my request) compared the following species with *Phlæocarabus Mastersi*, Macl., he thinks they are generically distinct. I do not doubt the correctness of Mr. Sloane's opinion, and am very glad to have received it in time to insert this note in the present memoir. Nevertheless, since these species undoubtedly present the characters attributed to *Phlæocarabus* in the published diagnosis of the genus, I think I do right in calling them by the name, and leaving them to bear it until the genus is re-characterized. I may say that Mr. Sloane draws attention to the much smaller size of the 2nd joint of the antennæ, and the wider and more *Xanthophæa*-like head in *Phlæocarabus*.]

PHLŒOCARABUS UNIMACULATUS, Sp.nov.

Sat elongatus; sat depressus; minus nitidus; testaceus, capite prothoraceque plus minus rufescentibus, elytris macula magna communi nigra antrorsum in sutura producta ornatis; capite prothorace longiori, subtiliter sat sparsim punctulato; prothorace capite vix latiori, quam longiori vix latiori, basi quam antice paullo angustiori, canaliculato, transversim subtilissime strigoso, latitudine majori paullo ante medium posita, angulis (anticis subrotundatis) posticis distinctis obtusis, lateribus sat rotundatis pone medium vix sinuatis; elytris sat fortiter striatis, apice singulatim late rotundatis, interstitiis subconvexis, striis latera versus obsoletis.

[Long. 2\frac{2}{5}, lat. 1 line.

Var. Elytris juxta scutellum utrinque macula parva fusca ornatis.

The spot on the elytra is diamond-shaped, but when closely examined its outline is seen to consist of about 16 distinct lines, so that it is really a 16-sided figure; it extends laterally two-thirds (or in some examples half) across each elytron; its hind point is about $\frac{1}{5}$ of the length of the suture from the apex of the same and is produced (gradually narrowing) forward to a point

not much behind the scutellum. The width across the prothorax is scarcely half as great as across the elytra.

S. Australia; Adelaide; also near Port Augusta.

PHLŒOCARABUS UMBRATUS, Sp.nov.

Minus elongatus; minus depressus; minus nitidus; testaceus, capite antice (et abdomine maculatim) infuscatis, elytris pone medium fascia lata angulata fusca (latera haud attingenti) ornatis; capite prothorace longiori, subtilissime vix manifeste punctulato; prothorace capite paullo latiori, quam longiori quarta parte latiori, basi quam antice sat angustiori, canaliculato, transversim subtilissime strigoso, latitudine majori paullo ante medium posita, angulis (anticis rotundatis) posticis distinctis obtusis, lateribus sat rotundatis pone medium sinuatis; elytris minus fortiter striatis, apice conjunctim rotundato-truncatis, striis latera versus obsoletis, interstitiis planis. [Long. $2\frac{3}{5}$ - $3\frac{1}{5}$, lat. 1- $1\frac{1}{5}$ lines.

The lateral extension of the fascia on the elytra is somewhat greater than of the spot on the elytra of *P. unimaculatus*, its front margin is angulated on the suture (which it crosses slightly in front of the middle) and also on each side of the same; it is not extended up the suture farther forward than it is at the lateral angulations; its hind margin is angulated on the suture and also at two or three points on either side, the sutural angulation extending furthest back (in some examples nearly to the apex) the lateral angulations being successively less prolonged hindward; in some examples fine fuscous lines run out hindward at intervals along the hind margin of the fascia.

A distinctly wider and less depressed species than the preceding, the prothorax distinctly transverse and distinctly more than half as wide as the elytra with front angles evidently less produced forward and the width at the base evidently less in proportion to the width of the front; the pattern on the elytra very different and the interstices of the same much flatter.

Near Adelaide; usually in flood refuse.

Phlæocarabus Crudelis, Newm. sp.

(? Dromius crudelis, Newm.).

The insect to which I have applied this name is probably identical with that on which the brief description of *Dromius crudelis*, Newm., was founded. That description deals only with colour and markings,—and those only in very general terms. If I should prove to be wrong in this identification there will be no harm done as in that case the probability is that Newman's insect is not a *Phleocarabus*, and then both names can stand.

The species before me will be thus characterized:—

Sat elongatus; sat depressus; minus nitidus; testaceus; capite supra, elytrorum macula (forma complicata) magna, et sternis abdomineque latera versus (hoc apice quoque), nigris; capite prothorace longiori, confertim subtiliter rugato; prothorace capite vix latiori, quam longiori vix quarta parte latiori, basi quam antice sat angustiori, canaliculato, transversim subtilissime strigoso, latitudine majori paullo ante medium posita, angulis (anticis rotundatis) posticis distinctis obtusis, lateribus sat rotundatis pone medium sinuatis; elytris sat fortiter striatis, apice singulatim late rotundatis, interstitiis subconvexis.

Long. 3-3 control of the striation of t

The black patch on the elytra occupies the greater part of the surface; the hinder portion resembles the dark fascia of *P. umbratus* but is extended nearly to the lateral margins; the middle of the anterior edge, however, of that fascia is continued widely forward and then again dilates into a large quadrate patch almost or quite touching the base. It should be noted that the prothorax is *reddish* testaceous, the other pale parts *yellowish*.

Apparently common in various parts of S. Australia; it occurs also in Western Australia.

Ectroma, gen.nov.

In the Berliner Ent. Zeit. 1873, p. 54, note, the Baron de Chaudoir stated that Cymindis inquinata, Er., Dromius tridens,

Newm., and Lebia benefica, Newm., and civica, Newm., require the foundation of a new genus near Sarothrocrepis. Chaudoir's lamented death rendered abortive the intention he appears to have entertained of dealing further with the subject at a later date, and I cannot find that any other author has dealt with it; I therefore propose for this genus the name Ectroma. The species from King's Sound described by Sir William Macleay under the name Sarothrocrepis probably belong to this new genus, which differs from Sarothrocrepis by the intermediate tarsi in the male not dilated nor bearing (except on the apical joint) a dense clothing of hairs beneath, by the shorter labrum, the apical joint of the labial palpi not "compressed, dilated and truncate at the apex," and the ligula longer as compared with its paraglossæ. Like Sarothrocrepis, its mentum has a long median tooth (which however is more pointed), the 4th joint of the tarsi is bilobed, the claws are pectinate, and in the male the apical ventral segment has the apical margin nicked in the middle. The genus is extremely near Lebia, but differs in the well-defined tooth of its mentum. From Eulebia, Macl., it differs by the less strongly dilated 4th joint of the tarsi, and from Lachnoderma, Macl., by the non-securiform apical joint of the labial palpi.

SAROTHROCREPIS SUAVIS, sp.nov.

Sat brevis; glabra; nitida; pallide testacea, elytris postice plaga magna communi nigra ornatis; capite prothoraci longitudine sat æquali, subtiliter coriaceo; prothorace capite dimidia parte latiori, quam longiori plus dimidia parte latiori, basi quam antice vix tertia parte latiori, subtiliter canaliculato, supra obscure transversim strigoso, latitudine majore mox ante medium posita, angulis anticis rotundatis, posticis rotundato-obtusis, lateribus leviter rotundatis pone medium sinuatis, sat late deplanatis; elytris sat fortiter striatis, apice oblique sinuato-truncatis, interstitiis leviter convexis.

[Long. $2\frac{2}{5}$, lat. $1\frac{1}{5}$ lines.

Maris palporum labialium articulo ultimo sat fortiter dilatatocompresso, haud securiformi, apice truncato; segmento ventrali apicali medio fortiter subtriangulariter emarginato; tarsorum

46

anticorum articulis basalibus 4 dilatatis subtus sat dense squamosis, intermediorum vix dilatatorum articulo primo apice 3que sequentibus subtus squamosis.

The black spot on the elytra is sharply defined and very conspicuous; it touches the apex in a point on the suture, thence its outline runs in a sinuate curve forward and outward on either side nearly to the lateral margin at a point considerably behind its middle, whence it turns towards the suture parallel to the base of the elytra to about the 5th stria, thence it runs up the elytron (but obliquely towards the suture) to a point not very much behind the middle of the same, and almost on the 4th stria where it makes a round turn and runs obliquely down the elytron to the suture. The prothorax, compared with that of S. posticalis, Guér., is more transverse and less narrowed in front and has the hind angles more rounded off. The black spot on the elytra somewhat resembles in form that on the elytra of S. corticalis, but is of less zigzag outline, extends much less forward, and is very much more sharply defined and conspicuous.

Port Lincoln, S.A.; also near Adelaide.

COPTODERIDES.

PHILOPHLŒUS EUCALYPTI, Germ.

This species is unsatisfactorily treated by de Chaudoir in his "Mem. surles Coptoderides," 1869. The description of it is limited to the statement that it is very close to intermedius, Chaud., and differs from the latter in a few specified characters among which the piliferous punctures of the prothorax are not included. In intermedius they are said to be only two on each side. In describing P. obtusus the author states that "as in Eucalypti" there are only 2 piliferous punctures on either side, but a little further on we are informed that P. planus, Newm., has 4 piliferous punctures on either side "placed as in Eucalypti." As it is quite impossible to make anything of de Chaudoir's remarks on this species, and as there can be little doubt that a well known species occurring commonly in many parts of S. Australia is that which Germar had before him, I subjoin a description of this latter, which I am

quite satisfied is the true *Eucalypti*; it is probably the species that de Chaudoir calls by the name.

Pubescens; sat parallelus; testaceus vel rufo-testaceus; elytris (marginibus lateralibus et vitta discoidali postice gradatim attenuata testaceis exceptis) nigro-piceis, abdominis apice infuscato; prothorace utrinque punctis setigeris 5 instructis, angulis posticis vix distinctis; elytris modice (ut P. australis) punctulatis substriatis, interstitiis leviter convexis. [Long. $4\frac{2}{5}$ - $5\frac{1}{5}$, lat. 2- $2\frac{1}{5}$ lines.

Maris tarsorum intermediorum articulis 1° (apice) et 2° subtus spongiosis.

Apart from the sexual characters this species is excessively close to $P.\ australis$, Dej., from which it differs as follows:—its average size is distinctly smaller; its prothorax is very evidently shorter (being slightly more than $\frac{2}{3}$ again as wide as its length down the middle) and is a little more emarginate in front; the yellow lateral margin of the elytra is wider (especially a little behind the base where it is more than half as wide as the interval between it and the juxta-sutural yellow vitta) and the juxta-sutural vitta is shorter (scarcely reaching into the apical $\frac{1}{5}$ of the elytron), with its hinder part gradually and strongly narrowed. The puncturation scarcely differs from that of $C.\ australis$, Dej. The suture is narrowly rufo-testaceous, this colour being a little dilated immediately behind the scutellum.

Of the previously described species of *Philophlæus* having the 3rd joint of the intermediate tarsi not spongiose below and the elytra with markings of the same type as those of *P. australis*, only two others have 4 or 5 setigerous points on the border of the prothorax and these (*puberulus*, Chaud., and *quadripennis*, Chaud.), have the puncturation finer and denser than in *P. australis*, while the former has the juxta-sutural yellow elytral vitta not at all narrowed ("nullement *amincie*") hindward, and the latter *inter alia* has the prothorax less strongly emarginate in front than that of *P. australis*. I have seen a fairly long series of both sexes and find scarcely any variation.

S. Australia; I have not seen specimens from further East than Yorke's Peninsula.

PHILOPHLŒUS FUSCIPENNIS, Germ.

This name should drop out of the Catalogue, as the description is certainly insufficient for positive identification, and it refers almost certainly to one of the insects described by the Baron de Chaudoir in 1869; the Baron thought it to be probably his *immaculatus* or *planus*. It appears to me more likely to be his *unicolor*, but as there seems to be no probability of arriving at any certainty on the point it would be better to treat the name as though it were non-existent.

PHILOPHLŒUS PLANUS, Chaud.

My collection contains a good many specimens which appear to appertain to this species. Unfortunately the description does not give any account of the colour of the prothorax. In my examples this segment is unicolorous with the elytra, having like them, a pale border. De Chaudoir also omits mentioning the colour of the elytra, merely remarking that they are devoid of pattern. My examples have brown elytra with a pale border. According to the description this species is distinguished from unicolor inter alia by its smaller size, but my largest examples are not smaller than the smallest measurements given for unicolor. The shortness of the elytra in proportion to their breadth, the evidently greater concavity of the front outline of the prothorax, and the greater contraction of this segment behind making the hind angles less marked appear however to be good characters, but (as de Chaudoir says) the two species are certainly very close to each other. I find that the number of piliferous punctures on the sides of the prothorax varies from 4 to 6.

PHILOPHLŒUS OPACICEPS, Sp.nov.

Pubescens; minus parallelus; testaceus vel rufo-testaceus; elytris (marginibus lateralibus exceptis) et abdominis marginibus lateralibus, infuscatis; capite subtiliter coriaceo et sparsius subtilius leviter punctulato; prothorace transverso subcordato, antice

fortiter emarginato, angulis posticis distinctis subrotundatis, basi bisinuata media parte late leviter lobata; elytris creberrime subtilissime punctulatis. [Long. $3\frac{1}{5}\cdot4\frac{1}{2}$, lat $1\frac{4}{5}\cdot2$ lines.

Maris tarsis intermediis simplicibus.

This species seems intermediate between Philophæus and Agonocheila,-the latter of which Baron de Chaudoir himself stated to be in strictness a mere subsection of Philophleus. Its tarsi are of Agonocheila; in other respects it is a Philophlæus. It differs from all its described allies in its head being subopaque through minute coriaceousness, and also sparingly sprinkled with faintly impressed punctures. The prothorax is extremely like that of P. unicolor, Chaud., but is slightly less transverse, with the front margin much more strongly concave and the hind angles a little less defined. The puncturation of the elytra is much finer and closer than in any other of the species of Philophlaus having elytra without discal markings. From planus and unicolor it differs by its less parallel form. Its superficial resemblance to P. immaculatus, Chaud., is most extraordinary; but it differs from it in the sculpture of the head and elytra, in the less transverse prothorax (which is more strongly emarginate in front), and in the sexual characters of the male. The sides of the prothorax bear two or three setæ in front of the middle, one close to the middle, and one at the basal angle.

S. Australia; under bark of Eucalyptus at Moonta, Port Augusta, and Port Lincoln.

AGONOCHEILA CRIBRIPENNIS, Chaud.

I possess specimens agreeing perfectly in respect of colour and markings with the description of this insect, but which are certainly only varieties of A. lutosa, Newm. Baron de Chaudoir says that cribripennis differs from lutosa in the puncturation of the elytra (which these examples do not, at any rate not in any invariable manner) as well as in colour and markings, and implies that there are some other distinctions (e.g., in the erect hairs of the prothorax), so it is quite possible that cribripennis is

a good species, closely resembling in colour and markings some varieties of *lutosa*. My collection contains several specimens intermediate in markings between those referred to above and typical *lutosa*, and some in which the dark markings are still more reduced till they consist of a mere infuscation of the front of the suture and a faint shading near the lateral margin. The species is common in South Australia.

SCARITIDES.

PLATYTHORAX (CARENUM) TRANSVERSICOLLIS, Chaud.

Sat nitidus; lævis; niger, elytris violaceo-marginatis; capite lato, brevi, supra oculos unipunctato; sulcis frontalibus profundis sat parallelis, antice fortiter divergentibus, postice quatenus oculi productis; prothorace quam longiori fere duplo latiori, antice quam postice vix latiori, leviter canaliculato, angulis anticis productis, posticis bene determinatis nihilominus rotundatis, basi bisinuata in medio nullo modo concava; elytris prothoraci latitudine æqualibus, sat late reflexo-marginatis, antice truncatis, suturam versus conjunctim late leviter concavis, tibiis anticis externe tridentatis.

[Long. 9, lat. 3\substitute{5} lines.

The prothorax is scarcely less (as 8 to $4\frac{1}{2}$) than twice as wide as its length down the middle. The basal lobe (which is wide and well-defined, though not much produced hindward) has its hind outline evenly convex all across—not at all concave or emarginate in the middle. The elytra are separately convex transversely—so that if their upper outline be viewed, looking from the head across the prothorax, it appears to be widely and feebly but evidently concave in the middle. [It is quite possible that this may be caused merely by slight immaturity.] The row of punctures on the declivous front margin of the elytra contains 3 on each side placed close together on the external half of the base, and a row of punctures runs just within the lateral margin, but the discoidal punctures of the elytra are entirely wanting. On the anterior tibiæ the teeth resemble those of Calliscapterus campestris, Macl. The inferior ridge reaches the tarsus.

The absence of discoidal elytral punctures approximates this species to Carenum ineditum, Macl., and some others which have only two teeth on the external margin of the front tibiæ. Its nearest ally, however, appears to be C. Macleayi, Blackb., from which it differs (independently of colour) by the longer frontal sulci of its head; its wider prothorax, the hind angles of which are less rounded off—the base being a gently bisinuate line as long as, and (along its whole length) parallel to, the front margin; and its elytra narrower anteriorly.

McDonnell Ranges, Central Australia; taken by Mr. A. S. Wild.

N.B.—The above species appears to be identical with *Carenum transversicolle*, Chaud., but as its author has not described that species, having done little more than mention some of its differences from its allies, I think it is well to furnish a formal description.

CLIVINA BOVILLÆ, sp.nov.

Minus angusta; minus parallela; minus convexa; subtus picea; supra obscure ferruginea, maculatim vix distincte infuscata, antennis palpis pedibusque testaceo-brunneis; prothorace postice quam antice fere tertia parte latiori, basi utrinque lineatim impresso, quam longiori vix latiori; elytris fortiter striatis, striis sat fortiter punctulatis, stria 4ª basi extrorsum contorta; clypeo ad latera rotundato vix producto; tibiis anticis externe dentibus 4 instructis, dente summo parvo, 2° sat magno, 3° majore etiam, apicali ceteros longitudine superanti. [Long. 3½, lat. ½ lines (vix).

This species may be placed in the "section" of M. Putzeys' "Revision Gen. des Clivinides" in which the author places C. Australasiae, C. vagans, &c. The clypeus is only very gently concave in front, those parts which M. Putzeys calls its "wings" being scarcely defined but being fairly distinct from what he calls the "large wings" of the head. The structure of these parts is not unlike the same in C. melanopyga, Putz., but the front of the clypeus is even less concave. The portion of the head behind the clypeus is vaguely impressed down the middle, and its front part

is comparatively strongly punctured. The interstices of the elytra are rather strongly convex, somewhat more so than in *C. melanopyga*, the striæ being not quite so distinctly punctured as in that species. The external teeth of the anterior tibiæ are considerably longer and more slender than in *C. melanopyga*, the 4th (*i.e.*, the uppermost) though small and blunt being quite well defined. The apical spine on the inner margin of the same tibiæ is much larger in the male than in the female. The flanks of the prosternum are oqaque on a sharply limited space (owing to the presence of close longitudinal strigosity), the opaque space also bearing some transverse strigæ which are much more continuous and deeply impressed than the longitudinal ones. This sculpture is exceptionally strongly developed,—much more so *e.g.* than in *C. melanopyga*.

N. Territory of S. Australia; taken by Mrs. Bovill.

CLIVINA ÆQUALIS, sp.nov.

Sat angusta; sat parallela; sat convexa; picea; antennis, palpis, elytris, pedibusque, plus minus ferrugineis; prothorace postice quam antice vix latiori, basi utrinque haud lineatim impresso, quam longiori paullo latiori; elytris fortiter striatis, striis sat fortiter punctulatis, stria 4ª basi extrorsum contorta; clypeo ad latera rotundato vix producto; tibiis anticis externe dentibus 4 instructis, dente summo parvo, 2° sat magno, 3° majore etiam, apicali ceteros longitudine superanti.

[Long. $2\frac{3}{5}$, lat. $\frac{3}{5}$ line.

Resembles the preceding, but differs as follows:—it is a little more elongate, parallel and convex; the head and prothorax are of a darker colour; the elypeus is flatter and still less distinct from its "wings;" the part which M. Putzeys calls the "anterior elevation" being not distinctly raised, and having no transverse furrow behind it; the head is wider and less shining; the prothorax is slightly wider in proportion to its length, being by measurement slightly transverse (to the eye it appears scarcely so), it is scarcely at all narrowed forward, the sides are strongly wrinkled transversely except near the front, the longitudinal

linear impression near the base on either side is entirely wanting, the central longitudinal channel is much stronger; the strize of the elytra are much more conspicuously punctulate except near the apex, the external teeth on the anterior tibize are even longer; the tarsi (especially the hind ones) are much more slender.

N. Territory of S. Australia; taken by Mrs. Bovill.

CLIVINA DORSALIS, sp.nov.

Sat angusta; sat parallela; minus convexa; picea; antennis, palpis, mandibulis (apice excepto), clypei lateribus, elytris latera versus, pedibusque, testaceis; prothorace postice quam antice vix latiori, basin versus utrinque lineatim longitudinaliter fortiter impresso, quam longiori vix latiori, sat fortiter punctulato; elytris fortiter striatis, striis sat distincte punctulatis, stria 4ª basi haud extrorsum contorta; clypeo ad latera breviter acute dentato; tibiis anticis externe dentibus 3 (dente 4° obsoleto) instructis.

[Long. $2-2\frac{2}{5}$, lat. $\frac{2}{5}-\frac{3}{5}$ line.

The pallid colouring on the elytra is very variable, in some instances being almost obsolete, in others (perhaps immature) occupying the whole surface; in average specimens the elytra bear 3 stripes of about equal width, the middle one common and piceous, the lateral ones pallid.

Apparently near *C. suturalis*, Putz., but differing from it in the prothorax being (by measurement) not at all longer than wide, and in the 4th stria not being deflected outwards at the base to meet the 8th stria which, however, meets the 5th stria, as in *C. melanopyga*.

Port Lincoln; also near Adelaide.

CLIVINA BOOPS, sp.nov.

Minus angusta; parallela; convexa; nigra; antennis, palpis, mandibulis (apice excepto), clypei lateribus, pedibusque, rufis; capite lato; prothorace postice quam antice haud latiori, basi utrinque nullo modo (nonnullis exemplis obsoletissime) lineatim longitudinaliter impresso, quam longiori fere quarta parte latiori, sat fortiter rugato latera versus sat fortiter punctulato; elytris sat fortiter striatis, striis sat fortiter punctulatis omnibus antice liberis,—plurimis postice obsoletis, interstitiis minus convexis; clypeo utrinque rotundatim minime ultra alam producto; tibiis anticis externe dentibus 4 (ut *C. aqualis*) instructis; menti dente medio sat acuto sat elongato.

[Long. 3¹₅, lat. ⁴₅ line.

Var. (? immat.) Corpore toto testaceo.

The distinguishing features of this species are:—tooth of mentum somewhat pointed and not much shorter than the lateral lobes of the same; wide head (evidently across the eyes, which are little convex, more than three-quarters the width of the prothorax); clypeus roundly prominent on either side and slightly more prominent than the lateral wings which are clearly distinct from it; vertex strongly punctulate on a space of variable size,—body of even width from the front of the prothorax to near apex of elytra; prothorax by measurement nearly a quarter (to the eye scarcely) wider than long and having its surface strongly wrinkled transversely and punctured towards the sides, without any longitudinal line impressed on either side near the base, no two elytral striæ distinctly connnected in front, &c., &c.

Port Lincoln; also near Adelaide.

CLIVINA ADELAIDÆ, sp.nov.

Sat angusta; parallela; minus convexa; nigra; antennis, palpis, mandibulis (apice excepto), clypei lateribus, pedibusque, plus minus rufescentibus; prothorace postice quam antice vix latiori, postice utrinque lineatim longitudinaliter impresso, sat lævi, longitudine latitudini æquali; elytris sat fortiter striatis, striis punctulatis, stria 4ª basi extrorsum contorta, interstitiis minus convexis; clypeo utrinque obsoleto minime ultra alam producto; tibiis anticis externe dentibus 4 (ut *C. æqualis*) instructis.

[Long. 32, lat. 4 line.

Var. (? immat.) Minor, corpore toto testaceo.

Resembles C. boops but is much more elongate with the prothorax very much narrower, 4th stria of elytra curved outward at the base to join the 8th.

Adelaide district.

CLIVINA TUBERCULIFRONS, sp.nov.

Sat angusta; minus parallela; minus convexa; ferruginea; capite inter oculos bituberculata; prothorace postice quam antice fere tertia parte latiori, postice utrinque lineatim longitudinaliter impresso, sparsim obscure rugato, longitudine latitudini æquali; elytris sat fortiter striatis, striis punctulatis, stria 4ª basi extrorsum contorta, interstitiis vix convexis; clypeo utrinque vix ultra alam producto; tibiis anticis externe dentibus 4 (ut *C. æqualis*) instructis. [Long. 2. lat. ½ line.

Distinguished from all the previously described Australian species of *Clivina* by the protuberance on either side of the frontal impression, and from nearly all by its diminutive size.

CLIVINA WILDI, sp.nov.

Minus angusta; minus parallela; sat depressa; picea, prothorace rufescenti, antennis, palpis, pedibusque, testaceis; prothorace postice quam antice quarta parte latiori; basi utrinque leviter lineatim longitudinaliter impresso, quam longiori vix latiori; elytris fortiter striatis, striis fortiter punctulatis, stria 4ª basi extrorsum haud contorta, interstitiis convexis; elypeo utrinque ultra alam producto; tibiis anticis externe dentibus 3 (dente 4° obsoleto) instructis.

[Long. 25, lat. 3 line (vix).

The 5th (not 4th) stria connecting on the base of the elytra with the external stria, together with the small size of the insect, and the uppermost tooth of the anterior tibiæ scarcely indicated will distinguish this from the previously described species.

McDonnell Ranges, Central Australia; taken by Mr. A. S. Wild, an intrepid explorer to whom I have much pleasure in dedicating this interesting little species.

CLIVINA DEBILIS, sp.nov.

Sat angusta; sat parallela; minus depressa; nigra; antennis, palpis, mandibulis (apice excepto), clypei lateribus et pedibus, testaceis; prothorace postice quam antice vix latiori, postice utrinque lineatim longitudinaliter impresso, sat lævi, longitudine latitudini æquali; elytris sat fortiter striatis, striis fortiter punctulatis postice subobsoletis, stria 4ª basi haud extrorsum contorta; interstitiis sat planis; clypeo utrinque haud ultra alam (hac vix distincta) producto; tibiis anticis externe dentibus 3 (dente 4° obsoleto) instructis.

Long. 2¹, lat. ³ line (vix).

Var. (?) Minor (long. 2 lines), dilutior, paullo minus convexa.

The 5th (not the 4th) stria connecting at the base with the 8th distinguishes this species from most of its congeners; from the rest it may be separated by the front outline of the clypeus not projecting on either side beyond the "wings," the prothorax having a distinct longitudinal impressed line on either side near the base, and the uppermost (4th) tooth of the anterior tibiæ being scarcely indicated.

Port Lincoln. The var. ? occurs near Adelaide.

CRATOCERIDES.

PHORTICOSOMUS RANDALLI, sp.nov.

Piceo-brunneus; nitidus; antennis, labro, palpis, pedibusque, rufescentibus; prothorace obsolete canaliculato, antice subtruncato, postice quam antice haud angustiori, angulis posticis rotundatis; elytris sat fortiter striatis, striis latera versus gradatim obsoletescentibus. [Long. 6, lat. 2²/₅ lines.

Closely allied to *P. felix*, Schaum, and *P. brunneus*, Blackb. From the former it differs in the colour of the antennæ, in the prothorax almost truncate in front, with hind angles quite rounded off, and a distinct flattened transverse space in front of the base (as in *P. brunneus*) and in the elytral striæ becoming quite feeble towards the lateral margins. From *P. brunneus* it

differs by its considerably larger size, prothorax not narrowed behind and having the hind angles rounded off, and by the enfeebling of the lateral strice on the elytra. All the other previously described species are either very much larger or very much smaller, except *P. Nuytsii*, Cast., from Western Australia, which is described as a black insect with the prothorax almost rectangular behind.

N. Territory of S. Australia; taken at Barrow's Creek by Mr. W. D. Randall, to whom I have dedicated it.

TRIGONOTOMIDES.

ABACETUS.

It seems at least doubtful whether the Australian species attributed to Abacetus and to Drimostoma are generically distinct inter se. Baron de Chaudoir (Bull. Mosc. 1870, p. 375), expresses the opinion that D. vicina, Cast., may be even specifically identical with his (de Chaudoir's) A. australis, but makes no comment on Castelnau's other species. Another of the insects referred (though in this case doubtfully) to Drimostoma by Castelnau (D. ? tasmanica) is asserted by Bates (Cist. Ent. II. 321) to be an Oopterus, a genus which Lacordaire associates with Cnemacanthus. Of the remaining four of Castelnau's Drimostoma, one (Thouzeti) is said to be very like vicina from which it is perhaps safe to infer that de Chaudoir would have called it an Abacetus. The rest are from the mountains of Victoria; D. australis may be almost anything,—if it be congeneric with D. vicina it would necessitate a new name for Abacetus australis, Chaud.; D. montana from the description (e.g. "thorax not marginated laterally") cannot have anything to do with Drimostoma, and the same remark would probably apply to D. alpestris, which is said to be very like D. montana, but the description is so worthless that unless the type can he referred to its identification is hopeless.

According to de Chaudoir *Drimostoma* and *Abacetus* resemble each other very closely in facies,—but that learned writer mentions as the main distinction between them that in the former the

lobes of the mentum are pointed at the apex, while in the latter the lobes of the mentum are rounded at the apex. Both genera were founded by Dejean for African species, some American insects having been doubtfully attributed afterwards to *Drimostoma* and some from the European coasts of the Mediterranean having been attributed to *Abacetus*. M. de Chaudoir expresses doubt as to *Drimostoma* being found in Australia (Ann. Soc. Ent. Belg. Vol. XV.).

I have in my collection a single example each of two species from the Northern Territory of S. Australia which appear to be congeneric with Abacetus australis, Chaud., but as the description of that insect merely states the colour and then points out the specific differences between it and R. flavipes, Thoms., (from Gaboon), giving no account of the structural characters, I think I shall do well to enumerate some of the characters of the present insects to prevent any inconvenient results in case I should prove to be wrong in supposing them congeneric with de Chaudoir's species.

They both belong to the group which Lacordaire calls "Trigonotomides" having the mentum (which drops very abruptly below the plane of the submentum and is separated from it by a strong carina) narrowed forwards, with its front margin only sinuated. The submentum is of peculiar structure, the middle part being a flattened plate bearing three strong longitudinal carinæ pointed in front, on either side of which it (the submentum) becomes somewhat declivous and is limited by a curved keel; the lateral portions of the mentum have a crimped appearance. I have not been able to examine the mentum satisfactorily except with a compound microscope, but probably if a specimen could be spared for the palpi to be removed it might be done with a Coddington lens. Of the maxillary palpi the 2nd and 4th joints are subequal, the 3rd being shorter; the 2nd is depressed and dilated, the 3rd is gradually dilated from the base to the apex and the 4th is narrowed from the base to the apex, these palpi thus not differing very much from those of Simodontus except in the second joint being considerably more dilated. Of the labial palpi the 2nd joint

is slightly longer than the 3rd of the maxillary and is slightly dilated from the base outwards, while the third joint is scarcely shorter than the 2nd and is slightly thickened for a little distance from the base and then attenuated towards the apex, the labial palpi thus scarcely differing from those of Simodontus. The prosternum has a wide shallow sulcus down the middle from a little behind the front nearly to the apex; it protrudes a little behind the front coxe, the protruding part being carinate round its free margin and bearing two strong foveæ on its surface. The intermediate ventral segments bear a large setigerous puncture on either side of the middle line, and are not furrowed transversely. The apical ventral segment in the female bears 4 setigerous punctures along the hind margin,—in the male only 2 punctures which however are very large ones. In the male the anterior tarsi are but little dilated and the basal ventral segment is concave down the front part of the middle line. [It must be remembered that the male and female appertain to very widely distinct species]. The very much lower plane of the mentum as compared with that of the submentum as well as the shape of the former in front, separate these two species widely from all the small Australian Feronides known to me. The episterna of the metathorax carry a well defined sulcus immediately within their margin all round so that their edge appears finely ribbed. I cannot discover any suture separating off from the episternum an apical piece (the epimeron); at the apical end of the episternum, however, the marginal sulcus is much further within the border than elsewhere, and I take the portion beyond it to be the epimeron. The episternum (including this piece) is not much less than twice as long as its width in front which slightly exceeds the width of the widest part of the elytral epipleuræ. The mandibles are nearly straight to near the apex where they are incurved and sharply pointed. The labrum is transverse, truncate in front. The head bears a strong transverse sulcus a little behind the labrum; the two ends of the sulcus turn at an angle and run backward on the head, diverging in a curve to the eye; a large deep impression on either side is bounded externally by these

curved lateral sulci. The antennæ when set back reach considerably beyond the base of the prothorax; they are moderately stout, the 2nd joint short, the rest subequal. The lateral gutter of the prothorax immediately within the turned up edge is wider and stronger than in most of the small Feronides (e.g. Simodontus) and is continued within the basal angle and a short distance along the base, and then turns and runs forward on the prothorax, forming an extremely strong sulcus. The 3rd interstice of the elytra bears a single puncture at about the middle of its length In one of my examples the 3rd interstice has another puncture near the front on one elytron only. There is no trace of an abbreviated scutellar stria.

The facies is not unlike that of Loxandrus.

ABACETUS SIMPLEX, sp.nov.

Q. Niger, subiridescens; antennis, palpis, pedibusque, rufescentibus; prothorace quam longiori tertia parte latiori, antice quam postice sat latiori, medio longitudinaliter fortiter sulcato, antice leviter emarginato, angulis anticis distinctis parum productis, lateribus sat fortiter rotundatis pone medium leviter sinuatis, angulis posticis acute rectis subdentatis, sulco laterali sat lato, sulco utrinque basali sat elongato; elytris fortiter striatis, striis lævibus, interstitiis minus convexis. [Long. 3, lat. 1 line.

N. Territory of S. Australia; taken by Dr. Bovill.

As I have not a type of A. flavipes, Thoms., I cannot form a very clear notion of A. australis, Chaud., but this species seems to differ from it, inter alia, in being iridescent and having antennæ of a uniform red colour. It is larger than any of the species of Abacetus that have been described by Sir W. Macleay, those nearest it in size, moreover, having the striæ of the elytra punctured. Drimostoma Thouzeti and vicina, Cast., have dark antennæ, with only the base pale.

ABACETUS CRENULATUS, sp.nov.

3. Niger; antennis, palpis, pedibusque rufescentibus; prothorace quam longiori plus tertia parte latiori, antice quam postice

parum latiori, medio longitudinaliter profunde sulcato, antice parum emarginato, angulis anticis obtusis, lateribus fortiter rotundatis mox ante basin sinuatis, angulis posticis minutis subdentiformibus, sulco laterali lato profundo, sulco utrinque basali minus elongato; elytris profunde striatis, striis fortiter crenulatis, interstitiis fortiter convexis. [Long. $2\frac{1}{2}$, lat. 1 line (vix).

Differs from A. simplex by its shorter and wider prothorax of which the sulcus within the lateral margin is much stronger, and by its still more deeply striate elytra, the striæ of the same being crenulate internally, and the interstices very much more convex; the legs (especially the hind femora) are of a darker colour. From A. australis, Chaud., and D. Thouzeti and vicina, Cast., it differs by its unicolorous antennæ and smaller size. Of Sir W. Macleay's species only A. ater and A. angustior are described as not having the elytral striæ simple; from the former of these it differs by its elytra much wider than the prothorax, and from the latter by its prothorax not "longer than the width." The median sulcus of the prothorax (as in A. simplex) is abbreviated at both ends.

N. Territory of S. Australia; taken by Dr. Bovill.

ABACETUS A. MACLEAYI, sp.nov.

A. flavipes, Macl., (nom. præocc.)

The above change in nomenclature seems to be required.

FERONIDES.

Prosopogmus.

Masters' Catalogue attributes 10 Australian species to this genus (or sub-genus), of which at most 3—Boisduvali, Cast., Reichei, Cast., (these two probably not specifically distinct inter se), and harpaloides, Chaud.,—seem to be entitled to their place. The error has probably arisen from the fact that de Chaudoir (Ann. Mus. Gen. 1874, p. 594) has most unaccountably placed

under the heading "Prosopogmus" a list of all the Feronides of Castelnau of which he has ascertained the types to be lost, and Mr. Masters has included these in the genus Prosopogmus.

PŒCILUS.

There appears to me to be no satisfactory evidence of the occurrence of any true Pacilus in Australia, as no author in calling any Australian species by the name has mentioned as present that distinctive character of Pacilus—the basal joint of the antennae carinated. P. Kingi, W. S. Macleay, could not be identified without reference to the type. The descriptions of P. lavis, Macl., and sulcatulus, Macl., do not read like those of Pacili, and that of P. semiplicatus, Cast., is quite useless. P. chlanioides, Macl., is stated by its author to resemble P. resplendens, Cast., which is a Chlanioideus.

RHYTISTERNUS BOVILLI, sp.nov.

Minus depressus; piceus, plus minus rufescens; prothorace quam longiori fere tertia parte latiori, postice utrinque bistriato; striis in excavatione vix manifesta positis, lateribus postice vix sinuatis, angulis posticis obtusis haud dentatis; elytris striis 5°, 6°, et 7° plus minus obsoletis; tarsis posticis extus vix perspicue sulcatis.

[Long. 6-6°, lat. 2¹, lines.

Average specimens of this insect are of a shining pitchy red colour, but I have before me a single example the colour of which is almost uniformly pitchy black. The antennæ and legs are fairly robust, resembling those of *R. liopleura*, Chaud., (and therefore very different from those of *R. sulcatipes*, Blackb.). The frontal sulci diverge strongly behind as in *sulcatipes* (in *liopleura* they are nearly parallel). The prothorax is scarcely so wide in front as at the base (in *liopleura* the base is slightly narrower than the front, in *sulcatipes* the base and front are equal); it is nearly a third again as wide as its length down the middle being slightly more transverse than in *liopleura* and *sulcatipes*; the sides are a little

less strongly rounded than in liopleura, and behind the middle are scarcely sinuated (in liopleura they are decidedly sinuate, in sulcatipes not at all); the hind angles are obtuse but not far from rectangular, without the slightest indication of a tooth directed outward (in sulcatipes they are much more obtuse, making an angle of about 60°, in liopleura they are distinctly dentate and directed outward); the 2 longitudinal sulci at the base on either side are better defined and more distinct from each other than in either liopleura or sulcatipes, the space separating them being almost on the same plane as the general surface of the prothorax. The strike of the elytra are almost as in sulcatipes being more strongly impressed than in liopleura, but the shoulders resemble those of liopleura being less produced forward than in sulcatipes.

I do not think that this insect is identical with any of those previously described, though it is difficult to be sure owing to the deplorably inferior quality of the descriptions of most of them. Here is an example :—if it is desired to ascertain whether a given specimen is R. cyathodera, Chaud., one turns to the description, so-called, of that insect and finds no actual description, but only a few notes on its differences from other species, commencing (I translate the Latin) "differs from levilatera in its much wider and shorter prothorax, &c., &c.," but no positive statement of characters. Thus referred back again to lævilatera one turns up that species and reads again no positive description, but "differs from liopleura in its narrower prothorax, not narrowed behind, &c., &c." This reminds one of "the House that Jack built," the prothorax of cyathodera being thus described as "wider and shorter than that of lævilatera which is narrower than that of liopleura;" and from this tangle it would require a clearer mind than mine to evolve the prothorax of R. cyathodera. In this confusion I fear at the risk of being prolix that I must conclude by giving my reasons for not identifying R. Bovilli with any previously described species. From liopleura and sulcatipes I have already distinguished it; levilatera is said to have the 5th stria on the elytra "omnino obliterata," and the external basal sulcus of the prothorax less defined that in liopleura; cyathodera is said to be an iridescent

insect with the external basal sulcus of the prothorax almost obliterated, and its size is much larger; in puella the prothorax is said to be cordate; in misera, Chaud., the prothorax is said to be longer than in liopleura with the external basal sulcus "obsoletior," and it is implied that the hind angles are dentate; angustulus, Macl., seems from the measurements and name to be a much narrower species (though I regard its identity as possible); limbatus, Macl., appears to be much smaller and very differently coloured.

N. Territory of S. Australia; taken by Dr. Bovill.

RHYTISTERNUS LIMBATUS, Macl.

Last year I met with a single example of a Rhytisernus, in the neighbourhood of Lake Eyre, which agrees so well with the description of this remarkable insect that I can hardly doubt its identity, although the type was found at King's Sound, in N.W. tropical Australia. The only discrepancy I notice is in the colour of the antennæ which is described as "piceous," whereas the antennæ in my specimen are of a brownish testaceous colour. The prothorax scarcely differs in any respect from that of the preceding species (R. Bovilli, Blackb.) except in having the two basal furrows near the external margin on either side placed in a common impression as in R. liopleura; the circular form (from some points of view) of the outer of these (referred to by Sir W. Macleay) seems to be characteristic of the species. The elytra compared with those of R. liopleura are more strongly striated and have the humeral angles sharper, -more dentiform, -but not the shoulders more produced.

LEPTOPODUS, Chaud.

This genus—proposed by the Baron de Chaudoir for *Pterostichus holomelanus*, Germ.,—has not been characterised so far as I can ascertain. The following characters will, however, suffice to distinguish it from other *Feronia*:—Basal joint of antennæ not carinate, 3rd interstice of elytra tripunctate, metathoracic

episterna (including the apical piece divided off by a fine suture) considerably longer than its front margin is wide, the front margin being considerably wider than the elytral epipleuræ, and no furrow running within the lateral margin; intermediate ventral segments transversely sulcate as in Simodontus, each ventral segment bearing two conspicuous setigerous punctures placed one on either side of (and near to) the middle, the apical segment of the female with an additional setigerous puncture on either side near the margin, prosternum produced widely and strongly behind the front coxe, the free outline of the produced part edged with a carina, the tarsi externally sulcate, the anterior tarsi with the basal 3 joints in the male strongly dilated and furnished beneath each with two rows (meeting at the base and strongly diverging forward to enclose the base of the rows belonging to the next joint) of very conspicuous white scalelike papillæ, mentum with a wide strongly declivous median tooth, the front of which is arcuately concave in the middle and prominent at the ends.

I am unable to find any structural characters to distinguish this genus from *Simodontus* except the strong declivity of the median tooth of the mentum and the strongly sulcate tarsi. The vestiture of the anterior tarsi in the male does not seem to differ noticeably.

Loxandrus.

I doubt whether the Australian species attributed to this genus are really congeneric with the American species for which the name was established, as the mouth organs do not appear to me to tally satisfactorily with the description, but as I have not a type of any of the American species for comparison I shall not venture to propose a new name. I have before me examples from various parts of S. Australia, and some from the Northern Territory, which do not seem to be specifically different inter se, although they vary somewhat in size (long. $3\frac{4}{5}-4\frac{1}{2}$ lines), and in some the elytral interstices appear slightly more convex than in others. I should say that $Pœcilus\ iridescens$, Cast., is most probably this

species. A very notable character of the insect before me is the presence of strong puncturation on the metathoracic episterna and on the sides of the metathorax and ventral segments, such puncturation being coarse and not close in front, and becoming gradually finer and closer hindward. There seem to be no good characters mentioned to distinguish from it *Pœcilus interioris*, Cast., *P. subiridescens*, Macl., and perhaps even *P. atronitens*, Macl.; this latter having "only a trace of iridescence on the elytra," is quite possibly distinct. *Pterostichus lævigatus*, Macl., also must be very near it.

SIMODONTUS.

I have lately been trying to identify the insects on which some of the earlier descriptions of the smaller species of Feronia (in the wide sense) were made, and have found that it is simply impossible to arrive at any assurance by other means than a comparison with types that are certainly not in Australia, and many of which are almost certainly non-existent. Most of the smaller species of this group appertain to the genus (or sub-genus) Simodontus, Chaud., which is characterised in terms that are quite unintelligible, viz., "Elytra ad striam tertiam tripunctata. Cætera ut in Orthomo, thoracis angulis posticis rotundioribus." On referring to the description of Orthomus (as quoted by Dr. Schaum in the "Insecten Deutschlands;" I have not the original, which appeared in the Bull. Mosc. 1838) one finds no distinct assertion as to the puncturation of the elytra, but a statement of the characters which distinguish Orthomus from Pæcilus and Adelosia (species of both these having the 3rd interstice tripunctate), which does not mention any difference in respect of these punctures. In the absence of a reliable type of Orthomus I should be at a loss even to attribute any Australian insect confidently to Simodontus were it not that the Baron de Chaudoir has given a further clue in describing the species he has attributed to the genus.

The Baron de Chaudoir appears to regard Argutor australis, Dej., as the type of Simodontus, unfortunately a species quite hopeless to identify with absolute certainty—at least in Australia. Dejean's description consists of 18 words, followed by a comparison of its subject with *F. barbara* (a species occurring on the eastern shores of the Mediterranean Sea); de Chaudoir (with exceptional facilities for comparison of types) is doubtful as to the insect it is founded on.

Next comes Simodontus aneipennis, Chaud., which is fairly well described; but a note at the end of the description says that "it is perhaps the Feronia australis, Dej."

In 1865 M. Motschoulsky described what is no doubt a Simodontus under the name (Argutor?) antipodum. [I have not seen the description.]

In 1868 the Count de Castlenau described as Feronia inedita an insect which is probably either a Simodontus or a Leptopodus from the Pine Mountains of Queensland. De Chaudoir in his memoir on the Castelnau collection makes no reference to it, from which it is to be inferred that the type has perished. But the description is, I think, sufficient to enable its identification on a specimen taken in the locality cited if such should turn up, when a more scientific description may be furnished.

At the same time the Count described as species of *Harpalus* two insects (*Fortnumi* and *brunneus*) which in his report on Count Castelnau's collection de Chaudoir asserts to belong to *Simodontus*.*

Three years later Sir William Macleay, in the "Insects of Gayndah," described as Argutor three species (foveipennis, nitidipennis, and oodiformis) which de Chaudoir says are Simodontus; of these fuller descriptions are desirable pointing out their distinctions from others of the genus.

^{*} I accidentally overlooked this note of de Chaudoir when in the Trans. Roy. Soc. S.A. x. p. 190, I expressed a doubt as to whether *H. Fortnumi* appertained to the *Harpalidæ*, but suggested that if of the sub-family at all it might be a form of *H. Deyrollei*. Mr. Masters also has evidently committed the same oversight in placing the two in *Harpalus*, in his "Catalogue of the described *Coleoptera* of Australia,"

In 1873 de Chaudoir described 6 new species of Simodontus, but in a manner quite useless to Australian students. Without plainly saying so he seems to assume that the doubt he previously expressed as to the specific distinctness of his S. aneipennis and Dejean's F. australis was unfounded. Of these 6 species convexus is merely compared in brief terms with australis, orthomoides with O. berytensis (a Syrian insect), transfuga with orthomoides, &c., &c. The Baron subsequently (Ann. Mus. Gen. 1874) expressed the opinion that three of them (he did not specify which) were identical with Sir W. Macleay's three species of Argutor from Gayndah.

Finally, in 1888 Sir William Macleay described S. occidentalis from King's Sound

I hardly see any satisfactory way out of this labyrinth, but I think any way is better than remaining in it, until some one is able to examine the types and report on them, which will probably be at the Greek Kalends. Rather than acquiesce in the theory that Australians are to consider themselves barred from giving names to the fauna of their country by the bad descriptions of foreign students, I offer to the Linnean Society, at the risk of eventually proving to have increased the synonymy of some species, descriptions of three Simodonti known to me, attributing to existing names two which appear to me likely to be entitled to them, and giving a new name to one which there is not evidence for considering as already satisfactorily named. The species with which I have to deal are all from Southern Australia-one from Mulwala in the south of N.S.W. being the most northern in its habitat; I shall therefore assume that I have none of Sir W. Macleay's species before me, which are all from the north, but unfortunately insufficiently described—the important character of the width of the prothorax at the front as compared with its width at the base (for example) not being alluded to, except in the case of one of them.

SIMODONTUS (HARPALUS) FORTNUMI, Cast.

Latus; sat brevis; nitidus; supra piceus; subtus cum palpis, antennis, pedibusque rufescens vel rufo-testaceus; prothorace quam

longiori dimidia parte latiori, postice quam antice vix latiori, margine antico parum concavo, lateribus sat æqualiter rotundatis, angulis posticis rotundato-obtusis, basi media leviter rotundatim emarginata, striola basali externa vix distincta; elytris basi externa nullo modo dentatis, subtiliter striatis, interstitiis planis, interstitio 3° tripunctulato. [Long. 3° lat. 1° lines.

The only species known to me (of the genus) which has the length of the elytra down the suture not at all greater (by measurement) than twice their width across the base. The prothorax scarcely (by measurement the base is ¹/₅ again as wide as the front) narrower across the front than across the base is also a good character, nor have I seen any other species having the prothorax as much as half again as wide as long. There is a very distinct transverse strip marked more or less distinctly with longitudinal scratches, and abruptly depressed below the general plane of the surface, running along the base of the prothorax from one to the other of the inner longitudinal foveæ. The external basal fovea on either side close to the hind angle of the prothorax is very feeble and from some points of view seems to be quite non-existent. The large setigerous puncture near the hind angle of the prothorax is (as usual in the genus) very distinct and well within the angle. The concavity of outline on the base of the prothorax is very clearly confined to the middle part of the base. The abbreviated stria close to the scutellum is exceptionally short. The transverse undulations on the prothorax mentioned by Castelnau are variable in intensity but never very noticeable without close examination. The episterna of the metathorax are wider than in the allied species.

Extremely abundant in S. Australia. I have not seen it further west than Yorke's Peninsula.

N.B.—I think there is scarcely any doubt that this insect is identical with S. curtulus, Chaud., and also with S. (Harpalus) brunneus, Cast. It seems to differ from S. foveipennis, Macl., and S. nitidipennis, Macl., by its short scutellar stria, from S. oodiformis by the feebler striation of its elytra, and from most of the other

described species by its prothorax not narrowed anteriorly. The description of S. brunneus is quite useless, giving no information whether the prothorax is narrowed anteriorly and dismissing all the sculpture of the prothorax with the brief expression "impressions moderately strong,"—but as it fits S. Fortnumi very well as far as it goes and is founded on specimens from Adelaide I feel no doubt of its identity.

SIMODONTUS AUSTRALIS, Dej.

My collection contains a single example taken at Port Lincoln which agrees very well with Dejean's description of this species. Unfortunately the description is so short that it is easy to suppose there may be other species that will fit it equally well, and as no more precise indication is given of the locality of the type than "New Holland" there is nothing but the description to guide one in selecting an insect to bear the name. However, I claim the name for this S. Australian species by adding to Dejean's diagnosis such particulars as will unmistakably associate the species in question with the name, feeling sure that nothing could dissociate the two unless it might be a reference to the original type. If that can be made and my present memoir should provoke someone to make it and set me right, I shall be very glad.

Minus latus; minus brevis; supra piceo-niger; subtus cum palpis antennis tibiis tarsisque rufescens, femoribus picescentibus; prothorace quam longiori tertia parte latiori, postice quam antice tertia parte latiori, margine antico sat concavo, lateribus leviter sat æqualiter rotundatis, angulis anticis prominulis, posticis rotundato-obtusis, basi rotundatim emarginata, striola basali externa obliterata; elytris basi externa nullo modo dentatis, sat fortiter striatis, interstitiis externis postice angustis convexis, interstitio 3° tripunctulato. [Long. 35, lat. 15] lines (vix).

Compared with S. Fortnumi this insect is very evidently longer, narrower, and more parallel; the head is smaller in proportion to the other parts; the prothorax is longer and flatter, more concave in front, with the front angles more prominent and less obtuse,

and the dorsal channel continued to the base, it is more narrowed towards the front; the inner longitudinal impression on either side at the base is longer and more sharply defined and the outer one quite or almost obliterated; the concavity of the basal outline is much wider, the sides of the base, moreover, not being at all directed obliquely hindward as well as inward from the basal angles (as they are in Fortnumi); the elytra bave much stronger striation and the lateral interstices become near the apex linear convex ridges; the abbreviated stria near the scutellum is much longer than in S. Fortnumi, reaching almost to the sutural stria. The elytra a little behind the middle are slightly wider than at the base.

Port Lincoln.

SIMODONTUS MURRAYENSIS, Sp.nov.

Angustus; piceus; capite prothoraceque obscure rufis (huic nonnullis exemplis marginibus rufo-testaceis), antennis palpis pedibusque rufis; prothorace quam longiori tertia parte latiori, postice quam antice fere tertia parte latiori, margine antico sat concavo, lateribus leviter arcuatis, latitudine majori ante medium posita, angulis anticis prominulis posticis fere rectis, basi late rotundatim emarginata, striola basali externa distincta; elytris basi externa minute dentatis, sat fortiter striatis, interstitiis externis postice sat angustis subconvexis, interstitio 3° tripunctulato.

[Long. 3_5^1 , lat. 1_{10}^1 lines.

This species differs from S. Fortnumi, Cast., in most respects in which S. australis differs from it; instead however of the external longitudinal impression at the base of the prothorax being obliterated or nearly so that impression is much better defined than in S. Fortnumi, and the concavity of outline of the base of the prothorax is almost evenly continuous from one hind angle to the other; the striation of the elytra moreover is not much stronger than in Fortnumi, but the lateral interstices are narrower and somewhat convex near the apex (less so however than in S. australis), while the elytra instead of being somewhat dilated behind the middle are at their widest very little behind the front whence they narrow continuously (though very slightly and gradually)

hindward. From S. australis this species may be known by its still narrower and more parallel form, the well defined outer impression on either side at the base of the prothorax, the continuous concavity of outline all across the base of the prothorax, the somewhat finer striation of the elytra the outer interstices of which are less narrow and convex behind, &c., &c. From both it differs in the distinct though very minute tooth-like prominence of the external apex of the basal keel-like line of the elytra, and its much more nitid surface.

Mulwala, N.S.W.; taken by Mr. T. G. Sloane in refuse from a flood in the Murray.

N.B.—It is possible that this may be identical with S. elongatus, Chaud. That species however is described as having an iridescent reflection, and in any case I do not think its name can stand as it has been given by the Baron de Chaudoir himself to two species in other sections of Feronia.

MICROFERONIA, gen.nov.

3. Mentum breve, antice minus fortiter emarginato, dente medio bifido instructo. Palporum articulus ultimus ovalis, apice sat acuminatus; metathoracis episternum (parte apicali pone suturam distinctam inclusa) quam latius fere dimidia parte longius, intra margines anteriorem interioremque sulcatum, margine anteriori quam elytrorum epipleura paullo latiori; segmenta ventralia haud transversim sulcata, segmento apicali punctis setigeris (antice, prope medium utrinque, postice 4 ad marginem apicalem, positis) instructo, segmentis 3 præcedentibus puncto setigero utrinque prope medium instructis; antennæ sat robustæ, articulo 1° sat elongato, ceteris brevioribus, 2° submoniliformi; labrum transversum, antice leviter emarginatum, utrinque tumidum; oculi sat magni, prominuli, sat grosse granulati; elytrorum interstitium tertium unipunctatum; tarsorum anticorum articuli basales 3 sat fortiter dilatati.

Q. Latet.

It should be noted that in this genus (as in many others of the Feronides) the bifid tooth of the mentum does not project forward as an uninterrupted continuation, but is a separate piece divided from the mentum by a perfectly distinct suture and is strongly declivous. This structure may readily be observed with an ordinarily strong lens in many of the larger Feronides (Prionophorus, Notonomus, Sarticus, &c.). In Rhytisternus, Simodontus, and others, the tooth of the mentum is more a continuation of the general plane of the surface. In small species where the tooth of the mentum is strongly declivous it is extremely difficult to see. In the present insect, although it is quite distinct under a compound microscope, I cannot obtain a satisfactory sight of it with a Coddington lens.

The labrum, too, is very peculiar, the lateral portion on either side being strongly tumid, so that the middle portion appears to be a sulcus. Another noteworthy character consists in the two large strong punctures placed in the front part of the apical ventral segment,—one on either side of, and close to, the middle line. The palpi, too, having their apical joint unusually long and dilated, are peculiar. The basal 3 joints of the antennæ are glabrous, the 4th belonging to the pubescent series.

The small insect for which I propose this name has the facies of Loxandrus. It also somewhat resembles Notophilus (Anisodactylidæ), from which the glabrous 3rd joint of the antennæ will at once distinguish it.

MICROFERONIA ADELAIDÆ, sp.nov.

Ovalis; sat convexa; nitida; piceo-nigra, supra iridescens; labro, mandibulis, antennis (his apicem versus vix infuscatis), palpis, pedibus, et elytrorum sutura margineque laterali, testaceis; prothorace leviter transverso, antice quam postice paullo angustiori, canaliculato, latitudine majori ante medium posita, margine antico subtruncato, lateribus leviter rotundatis postice haud sinuatis, angulis posticis subrotundatis, sulco longitudinali elongato

utrinque ad basin posito; elytris fortius striatis, striis lævibus, interstitiis planis, stria abbreviata scutellari foveiformi, basali.

[Long 2 (vix), lat. 4 line.

Near Adelaide; a single example.

ANCHOMENIDES.

LESTIGNATHUS MINOR, sp.nov.

Sat elongatus; sat robustus; niger vix viridi-æneus; antennis (articulis basalibus 3 plus minus piceis exceptis), palpis, tarsisque rufescentibus; pedibus piceis; capite sat angusto, oculis magnis prominulis; prothorace quam longiori dimidia fere parte latiori, antice quam postice sat angustiori, pone marginem anticum breviter profunde transversim impresso, sat fortiter canaliculato, lateribus ab angulis anticis (his obtuse productis) ad basin gradatim magis fortiter explanatis, angulis posticis rotundatis; elytris quam prothorax vix duplo latioribus, fortiter striatis, striis lævibus, interstitiis (præsertim postice) convexis. [Long. 5, lat. 2½ lines.

This species has something of the facies of Agonum.

Port Lincoln; a single example was found running in the sunshine on sandhills behind the beach.

PLATYNUS MARGINELLUS, Er.

I have in my collection a series of specimens from various localities which tally perfectly with Erichson's description, but if I am right in my identification (of which I feel no doubt) that description omits a very distinctive character,—viz., that the 3rd stria on the elytra is conspicuously deepened from near its base to about the middle, the 5th stria also presenting a similar structure less conspicuously near the apex. Specimens from Western Australia appear to be a little more robust in build, with slightly stouter antenne, these latter and the legs being of a paler colour than in average examples taken near Adelaide, but there seems no reason to consider them as specifically distinct. I suspect that Anchomenus

nigro-eneus, Newm., is the same insect. The only noteworthy differences between the two descriptions are that Newman does not mention the reddish pitchy colour of the extreme margin of the elytra (which is scarcely noticeable in some examples before me) and that he calls the strike of the elytra "haud puncta," while Erichson says "striks omnium subtilissime punctulatis."

PLATYNUS MURRAYENSIS, Sp.nov.

Elongatus; parallelus; testaceo-brunneus, pedibus dilutioribus; prothorace capite parum latiori, quam longiori vix latiori, subtiliter canaliculato, basi margini antico latitudine æquali, lateribus leviter arcuatis, latitudine majori mox ante medium posita, angulis, posticis obtusis; elytris subtiliter striatis, striis vix perspicue punctulatis, stria 3ª ante medium manifeste profundiori.

[Long. 4^2_5 , lat. 1^2_5 lines.

The width of the prothorax scarcely exceeds that of the head across the eyes; the elytra are unusually narrow in proportion to the prothorax (as 14 to 9); the prothorax is scarcely $\frac{1}{6}$ wider than long. This species bears some superficial resemblance to the European Anchomenus livens, Gyll., but is considerably narrower and more elongate. It is at once distinguished from P. marginellus, Er., by its much more elongate form and prothorax scarcely wider than long, as well as by its colour, and the less noticeable deepening of the 3rd stria of the elytra.

Murray Bridge, S.A.; on swampy ground.

HYDROPHILIDÆ.

HYDROBIOMORPHA HELENÆ, sp.nov.

Sat convexa; sat late ovalis; nitida; subtus dense breviter pubescens, piceo-rufa; supra crebre minus subtiliter punctulata, olivaceo-nigra; elytris vittis 6 viridibus notatis; labri et clypei parte anteriori, palpis (apice summo nigro excepto), antennis (articulis ultimis 3 piceis exceptis) et pedibus, rufo-testaceis;

prothoracis angulis posticis vix rufescentibus; capite prothorace et elytris punctis majoribus seriatim (ut $H.\ Tepperi$ dispositis) instructis, his capillos subtiles ferentibus; mesosterni carina antice haud abrupte declivi. [Long. 6-7, lat. $3-3\frac{1}{2}$ lines.

Maris palporum maxillarium articulo 3° valde dilatato.

Of the elytral stripes (which are of a dull pale green colour) the first is close to the suture, the next 4 coincide with the rows of larger punctures, the last is very near to the lateral margin. Apart from colour this species differs from *Tepperi* as follows,—it is a broader insect with less parallel sides, the surface is a little more conspicuously punctulate, the hind angles of the prothorax are less rounded off, the penultimate joint of the maxillary palpi in the male is very much more strongly dilated, and the mesosternal carina is much less abruptly declivous in front. This latter character, *inter alia*, will distinguish the species from *H. Bovilli*.

I observe in the three species of this genus a character that had escaped my attention when I described the generic characters;—the mesosternal keel is nicked by a little emargination close to its anterior declivity, and this makes the extreme front appear as a small conical tubercle.

I have dedicated this insect to Mrs. Bovill, who has recently given me three specimens of it from the N. Territory of S. Australia, and whose explorations in that interesting region have brought to light not a few new species.

LONGICORNES.

MICROTRAGUS ASSIMILIS, Sp.nov.

Dense pallide sqamulosus, palpis testaceis, mandibulis nigris; prothorace (spinis lateralibus exclusis) quam latiori paullo longiori, antice quam postice vix angustiori, supra fortiter depresso, utrinque spina robusta conica instructo, supra leviter (ad latera crassissime) punctulato, lateribus leviter arcuatis; scutello valde

transverso, transversim concavo; elytris prothorace (spinis lateralibus inclusis) sat latioribus, carinis 2 (discoidali integra, externa serrata) instructis, illa antice spinam robustam extrorsum inclinatam formanti, parte dimidia discoidali antica sparsim subtiliter (postica vix. perspicue) punctulata, parte declivi laterali antice granulata postice sparsim subtiliter punctulata, apice singulatim oblique truncato explanato.

[Long. 11, lat. 4 lines.

The entire surface, including the underside, antennæ and legs is covered with even, very close, adpressed scale-like pubescence of a pale drab colour, slightly darker on the sides of the prothorax, and is devoid of erect hairs save a few fine and inconspicuous ones on the prothorax and antennæ; the large coarse punctures on the declivous sides of the prothorax, however, each contain a small granule not rising above the surface and concolorous with it; the granules on the front part of the sides of the elytra are black and shining. A broad space down the middle of the prothorax is · devoid of punctures. The spine at the base of each discoidal carina is very little raised above the surface, its projection being almost wholly lateral. The discoidal carinæ are pitted on their sides posteriorly with a few large punctures which give them a serrated appearance when viewed from above, but their upper outline viewed from the side is seen to be almost entire, a little waviness being noticeable in the hinder part. The apex of each elytron is explanate and obliquely truncate, the external end of the truncation joining the lateral margin in a somewhat angular manner.

Allied to *M. Waterhousei*, Pasc., and *M. Mormon*, Pasc. It differs, *inter alia*, from the former by the absence of hairs from the body, and by the discoidal carina not being a row of tubercles,—from the latter by the absence of hairs and by the differently formed apex of the elytra.

Fowler's Bay.

MICROTRAGUS ALBIDUS, sp.nov.

Dense squamosus, squamis fuscis griseis et albidis confuse intermixtis, palpis testaceis, mandibulis nigris; setulis erectis

brevibus nigris (nisi sub lente vix perspicuis) sparsim vestitus; capite pedibusque certo adspectu totis albis; prothoracis spinis lateralibus et disco antice, utrinque albis; antennis fuscis, articulis singulis basi albis; prothorace (spinis lateralibus exclusis) quam longiori parum latiori, antice quam postice paullo angustiori, supra parum depresso, utrinque spina brevi conica instructo, supra fortiter subcrebre (ad latera crassissime) punctulato, lateribus leviter arcuatis; scutello haud transverso, apice subacuminato: elytris prothorace (spinis lateralibus inclusis) vix latioribus carinis 2 serratis instructis, carina discoidali antice processum magnum obtusum suberectum formanti; parte dimidia discoidali antica subtiliter sat crebre (postica vix perspicue) punctulata; partibus tertiis anticis 2 declivibus lateralibus, sat crebre granulatis; apice singulatim suboblique truncato vix [Long. 10, lat $3\frac{1}{2}$ lines (vix). explanato.

Differs from M. Waterhousei, Pasc., inter alia by the longitudinal line on the head running very conspicuously the whole length from the clypeus to far behind the level of the eyes, by the length of the scutellum equal to the width of the same, by the truncate apices of the elytra, by the shape of the elytral carinæ—which are continuous, though their outline (from any point of view) appears serrated—by the form of the process at the base of the inner carina, which closely resembles the pommel of a lady's saddle—being compressed, with a roundly truncate apex.

Differs from M. Mormon, Pasc., and from M. assimilis in many respects, and especially in the totally different scutellum.

When closely examined this species appears to be rather closely sprinkled all over with minute snowy-white spots, such spots consisting of single white scales interspersed with the darker ones.

W. Australia; sent to me by Mr. T. G. Sloane.

MICROTRAGUS MACULATUS, Sp.nov.

Dense pubescens; pube in corpore subtus in capite in antennis in pedibus et in prothoracis elytrorumque lateribus grisea, in pro

thorace supra et in elytrorum maculis nonnullis nigra, in prothoracis maculis nonnullis et in elytrorum partibus discoidalibus (maculis nigris exceptis) fulva; prothorace (spinis lateralibus exclusis) quam latiori paullo longiori, antice quam postice haud angustiori, supra sat convexo, utrinque spina magna robusta conica instructo, rugulose crassissime punctulato, lateribus minus fortiter arcuatis; scutello parvo elongato-triangulari; elytris prothorace (spinis lateralibus inclusis) vix latioribus, supra sat leviter (latera versus grosse) sparsim punctulatis, carinis 2 simplicibus instructis (exteriori antice obsoleta, altera antice spinam robustam obtusam suberectam formanti), apice minute divaricatis; corpore toto, antennis, pedibusque, setis plus minus squamiformibus (alteris albidis alteris nigris) vestitis.

The antennæ (by measurement) are slightly more than $\frac{2}{3}$ the length of the whole insect. The spots of fulvous pubescence on the prothorax are not very conspicuous,—one occupies the centre of the disc, another (smaller) is on either side a little in front of the middle. The black spots on the elytra are extremely conspicuous and are arranged as follows;—about 9 small spots down each side of the suture (the last 3 or 4 more or less confluent on each row),—the basal tubercle and about 4 spots (the 2nd and 3rd largest) on the discoidal carina,—a very large spot of irregular form extending from near the lateral margin to near the discoidal carina and longitudinally from the apex of the basal $\frac{1}{5}$ of the elytron to the middle,—two or three spots on the defined part of the external carina; all the punctures on the elytra also more or less black.

Near M. Arachne, Pasc., and sticticus, Pasc. From the former it differs inter alia in colour (e.g. head pale grey instead of dark brown), also in having the external elytral carina scarcely traceable except in its hinder half instead of "entire and well marked;" from the latter in having the pubescence of the black spots (apart from colour) quite similar to that of the rest of the surface instead of "composed of stiff erect hairs * * * raised above the surrounding pubescence." The discoidal carina is bent round towards

the suture at its apex, but does not reach the latter. Probably the black spots are subject to more or less variety.

Barrow's Creek, N. Territory of S. Australia; taken by Mr. W. D. Randall.

ATHEMISTUS BITUBERCULATUS, Pasc.

I have before me specimens—one at least of them from Gippsland, Vict., (taken by Mr. T. G. Sloane)—which agree with the description of this species in every respect except the puncturation of the head, which in all of them is very distinct though sparse and rather fine. Mr. Pascoe says, "head almost impunctate except on the vertex." I can hardly think the insect distinct from that Mr. Pascoe described.

MOLLUSCA TRAWLED OFF MERIMBULA, NEW SOUTH WALES.

By J. Brazier, F.L.S., &c.

The Australian Museum received last month from Mr. F. W. Smithers, Inspector of N.S.W. Fisheries, a small collection of shells trawled by him off Merimbula in 17 fathoms. The only species of special interest is the *Crassatella Kingicola*, Lamk., now for the first time recorded from the New South Wales coast.

Other things might have been obtained if some practical scientists had been sent on behalf of the Museum to look after what came to the surface, instead of its being discarded and thrown back into the sea as rubbish, as is very often done by those who do not know what they are doing. Appended is a list of the species obtained.

1. Cassis Pyrum, Lamk.

Cassis pyrum, Lamarck, Anim. s. Vert. Vol. VII. part 1, p. 226; Kiener, Coq. Viv. p. 39, pl. 13, fig. 25, pl. 15, fig. 30; Reeve, Conch. Icon. Vol. V. pl. 11, fig. 29 b; Conch. Cab. 2nd ed. Kuster, p. 29, pl. 47, figs. 5-6.

The only specimen measures $2\frac{1}{2}$ inches long, and was the home of an hermit crab, *Clibanarius strigimanus*, White.

2. Myochama anomioides, Stutchbury.

Myochama anomioides, Stutchbury, Zool. Journal, Vol. V. p. 97, Tab. Supp. 42, figs. 1, 2, 3, 4; Myochama anomioides, Hancock,

Ann. Mag. Nat. Hist. Vol. XI. p. 287, pl. 11. (Animal), 1853; Myochama anomioides, Woodward, Manual, pl. 23, fig. 13; Myochama anomioides, Reeve, Conch. Icon. Vol. XII. pl. 1, fig. 4c, 1860; Myochama Keppelliana, A. Adams, Proc. Zool. Soc. p. 90, pl. 15, fig. 1, 1852; Myochama Stutchburyi, A. Adams, Proc. Zool. Soc. p. 90, pl. 15, fig. 4, 1852; Myochama Keppelliana, Reeve, Conch. Icon. Vol. XII. pl. 1, fig. 2, 1860; Myochama anomioides, Chenu, Manuel Conch. Part 2, p. 52, fig. 219; Myochama Stutchburyi, Chenu, fig. 218; Myochama Keppelliana, Chenu, fig. 220, 1862; Myochama anomioides, Fisher, Manuel de Conch. p. 1159, pl. 23, f. 13.

One living specimen attached to the posterior end of Crassatella Kingicola, Lamk. The so-called Myochama transversa, A. Adams, and Myochama tabida, Reeve, are merely local varieties of M. anomioides, Stutchbury, found in and around Moreton Bay and Port Curtis, Queensland. Myochama anomioides and varieties I have found on Venus (Antigona) lamellaris, Schumacher; Circe scripta, Linné; Circe rivularis, Born; Chione roborata, Hanley; Trigonia Lamarcki, Gray; Pectunculus Grayanus, Dunker; Pectunculus holoserica, Reeve; Corbula Smithiana, Brazier; Mitra solida, Reeve; Cardita amabilis, Deshayes; Crassatella Cumingi, A. Ad.; in Port Jackson and Moreton Bay.

3. VENUS (CHIONE) ROBORATA, Hanley.

Venus roborata, Hanley, Proc. Zool. Soc. p. 161, 1844, Recent Shells, App. p. 361, pl. 16, f. 25; Reeve, Conch. Icon. Vol. XIV. pl. 23, fig. 183; Sowerby, Thes. Conch. Vol. II. p. 723, pl. 157 fig. 117-118.

The single example is not of that ivory-white colour like the type from Tasmania, but of a chocolate-brown, and thinner with the ribs very slightly reflected.

4. VENUS (TIMOCLEA) GALLINULA, Lamarck.

Venus gallinula, Lamk. Anim. s. Vert. Vol. V. p. 592, No. 25; Sowerby, Thes. Conch. Vol. II. p. 730, pl. 162, fig. 225-226.

One single specimen obtained ornamented with three dark brown rays on each valve, concentrically fimbriately ribbed, finely radiately ridged on the posterior side; interior of the valves dark violet.

5. CYTHEREA (CALLISTA) RUTILA, Sowerby.

Cytherea rutila, Sowerby, Thes. Conch. Vol. II. p. 743, pl. 163; Dione rutila, Reeve, Conch. Icon. Vol. XIV. pl. 5, fig. 18; Dione rutila, Deshayes, Catalogue Conch. of British Mus. p. 58.

One specimen was obtained. The brown rays are not interrupted as is generally the case with this species when fresh from the sea. It is one of the most handsome species found on the coast, being entirely of a splendid bright pink with the brown rays and zones showing out in bold relief; after a few days they begin to fade, and the bright pink only shows round the margins.

6. Crassatella Kingicola, Lamarck.

Crassatella Kingicola, Lamarck, Anim. s. Vert. Vol. V. p. 481, No. 1; Crassatella Kingicola, Reeve, Conch. Icon. Vol. I. pl. 1, fig 5.

Two specimens obtained differ very much; one is ovately orbicular, slightly depressed, the umbones strongly plaited, of a rose tinge-colour; anterior side rounded, posterior side rather long angulated: the second one partakes of the character of Crassatella castanea, Reeve, the anterior side rounded; posterior angular and abrupt. I believe that seven of the so-called species of Crassatella from Australia are one and the same species, and are not even to be called varieties, viz.:—Crassatella Kingicola, Lamarck; C. donacina, Lamarck; C. castanea, Reeve; C. decipiens, Reeve; C. errones, Reeve; C. pulchra, Reeve; and C. Cumingi, A. Adams.

During the S.E. gale of May this year, Mr. E. Richards found washed up on the beach two miles north of Ballina, Richmond River, two specimens of a *Crassatella* which are evidently the young of Reeves' C. pulchra = C. Kingicola, Lamarck.

7. PECTUNCULUS GRAYANUS, Dunker.

Pectunculus Grayanus, Dunker, Proc. Zool. Soc. p. 357, 1856.

Sixteen specimens were obtained. A thick orbicular shell, mostly white with angular streaks and flames of chestnut-brown colour; it is a very variable species a number of specimens having a fringe of velvety epidermis round the margins.

ON THE FURTHER STRUCTURE OF CONULARIA INORNATA, DANA, AND HYOLITHES LANCEOLATUS, MORRIS, Sp., (=THECA LANCEOLATA, MORRIS).

By R. ETHERIDGE, JUNR.

Palæontologist to the Australian Museum and Geological Survey of N.S.W.

1. Conularia inornata.

(Plate xx., fig. 1).

Conularia inornata was originally described * by Prof. J. D. Dana from a fragmentary specimen obtained during the visit of the United States Exploring Expedition under Commodore Wilkes, U.S.N., to these shores. A few years ago more perfect examples, upwards of one foot in length, were described † by the late Prof. L. G. de Koninck, in the collection of the late Rev. W. B. Clarke, F.R.S. So far, however, the structure of the proximal end of the shell is unknown.

In 1873 the writer had the good fortune to figure the most perfect example of *Conularia* yet discovered, ‡ from the Carboniferous Limestone of the East of Scotland, in which the sides of the shell were inflected inwards, on all four sides, at a regular and similar angle, and to a like extent, each flap separated as it were by a deep groove from its neighbour, and the whole leaving

^{*} U.S. Exploring Expedition, 1838-1842, under Charles Wilkes, U.S.N. Vol. X. Geology, by J. D. Dana, 1849, p. 709.

[†] Foss. Pal. Nouv. Galles du Sud, Pt. 3, 1873, p. 314, t. 22, f. 14.

[‡] Geol. Mag. 1873, X. p. 295.

a quadrangular aperture at the summit of the proximal end. A forecast of this structure had been previously figured * by James Sowerby, the summit of whose specimen had the edges of the broader or truncated end of the cone turned inwards; but this seems to have been regarded by Sowerby and subsequent writers, to judge from the manner in which it has been overlooked, merely as a lateral crushing and displacement of the test. Two of the Upper Silurian Conulariæ† figured by the late M. Barrande likewise show traces of this peculiarity, viz., C. plicosa, Barr., and C. anomala, Barr.

Mr. J. Waterhouse, M.A., Inspector of Schools, Dungog, lately forwarded to the Mining and Geological Museum, Department of Mines, some calcareous spherical nodules of grey micaceous very hard mudstone, which he had obtained from a sandy shale in the sinking of the East Maitland Coal Co.'s shaft near Farley, in the Upper Marine Series, at a depth from the surface of aboutsixty feet. These nodules proved to be very fossiliferous, containing in some instances a number of Conularia inornata, almost invariably associated with fossil wood. None of the Conularia are absolutely perfect, but several are of great interest from the fact that the sides of the cone at the broader or proximal end are bent inwards, foreshadowing the structure of the Scotch specimen previously referred to.

In some the evidences of crushing by the surrounding matrix are apparent by the displacement and distortion of the transverse ornamenting ridges, but in other cases the bending inwards is so gradual, and the regularity of the other features so maintained, that a closure of the proximal end may, I think, fairly be anticipated in *Conularia inornata*. Although there are too many traces of pressure to warrant us in wholly ascribing this appearance to natural form, the attention of collectors should be drawn to it from the large size assumed, and important position occupied,

^{*} Mineral Conchology, iii. p. 107, t. 260, f. 4. † Syst. Sil. Centre Bohême, 1867, iii. t. 6, f. 1, and t. 8, f. 15.

by Conularia in the marine beds of the N. S. Wales Permo-Carboniferous System. Many points in the life history of Conularia yet remain to be solved, such as its proper place in the zoological scale, perfect condition of the shell, and other details. The constant association of wood with the mollusc in these nodules is, to say the least of it, peculiar.

2. Hyolithes lanceolatus.

(Plate xx., figs. 2-7).

One of the few known Carboniferous species of J. D. C. Sowerby's genus Theca was described by the late Prof. John Morris in Strzelecki's work * as Theca lanceolata, from Illawarra, and it also happens that this was likewise the first enunciation of the genus. It was pointed out, however, by the late M. Barrande † that Eichwald's genus Hyolithes, proposed for similar supposed lanceolate-shaped shells, was published five years before the appearance of Strzelecki's work. This is unfortunate, as Sowerby and Morris's genus had become well-known and established amongst geologists; but as the strict law of priority necessitates the adoption of Eichwald's name, our Australian fossil must in future be known as Hyolithes lanceolatus, Morris, sp. This is much to be regretted, for Morris's description is far more comprehensive and fuller than Eichwald's.

The Mining and Geological Museum is again indebted to Mr. John Waterhouse for some excellently preserved specimens of this shell with the operculum in situ. The first observer to make known the presence of an operculum in Theca, so far as I am aware, was the late Mr. J. W. Salter,‡ but this part of the economy was afterwards copiously illustrated by Barrande. Salter remarked that the shell described by him as Theca operculata, had "constantly associated with it, and often in juxta-

^{*} Phys. Descrip. N. S. Wales, &c., 1845, p. 289, t. 18, f. 8. + Loc cit. p. 55.

[‡] Mem. Geol. Survey Gt. Britain, iii. 2nd Edit. 1881, p. 558.

position, a shelly plate which would just fit the aperture." In thus possessing an operculum *Hyolithes* departs from the structure of the straight or slightly curved Pteropods, in which opercula are rare, and approaches the spirally-rolled forms, many of which are furnished with one, and it therefore occupies a very marked position in the Thecosomate division of the Pteropoda. For this *Theca*-like shell with an operculum Salter adopted the sub-generic name of *Cleidotheca*.

The description of *Hyolithes lanceolatus* by Morris is as follows:—"Shell elongate, gradually tapering; section obtusely trigonal; surface marked with numerous transverse striæ, which become arched as they pass over the posterior (?) portion of the shell."

The general form of the shell in *Hyolithes* is elongately pyramidal, usually curved, but occasionally straight. The curvature occurs in one of two directions—either in the plane of the broader faces or laterally. The transverse section is triangular—either rectilinear or curvilinear. The faces of the pyramid are usually plain, but at times marked by longitudinal ridges. The aperture is generally oblique to the longer axis, and in some a segment of a circle, often semicircular. The sides, or lesser faces, are acute or rounded; whilst the summit of the shell is always acute, and in some species, according to Barrande, septate.

Hyolithes lanceolatus conforms generally to the generic characters. In its specific features it may be said to be elongately pyramidal and much compressed. It is but little arched longitudinally, in fact the shell is almost in one plane; transversely it is equally little arched, the section being slightly trigonal or unequally oval, the lateral faces being obtusely rounded. The perfect apex of the shell has not come under my notice, nor have I seen any trace of septation. The test is highly ornate, being covered with obtuse concentric rugæ parallel to the sectional outline, separated by very shallow interspaces of about their own width apart, both being again traversed by delicate continuous striæ following the same direction. The whole of this trans-

versely arranged ornament is broken up into a festoon-like appearance by delicate longitudinal, inequidistant grooves. The former is directed convexly upwards towards the aperture on the chief face of the shell, sigmoidally curved on the sides and horizontal on the lesser of the principal faces.

The most interesting point, however, is the operculum. This organ in Hyolithes consists of two essential parts—a chief semiconical portion, the semicircular base of which is applied to the margin of the larger face; and a smaller portion separated from the former by two rather deep grooves radiating from an umbo. and always inclined more or less at an angle to the major portion. The operculum of *H. lanceolatus*, of which we possess an excellent example separated from the shell, and another attached in situ, is ornamented in a similar manner to the shell, but the festoon shaped striæ become concentric in the strict sense of the word. and are uninterrupted by regular radiating grooves, although from the umbo to the convex margin of the larger half proceed two or three indefinite radiating wrinkles. On the surface of the smaller concave portion of the operculum are two additional diverging grooves from the umbo, separating off, with the assistance of those formerly mentioned, two elongately triangular spaces. The concentric lines on the smaller portion are much coarser than on the conical or convex half. On the whole this operculum has much the appearance of some Chiton plates.

The specimens are taken to be *Hyolithes lanceolatus*, although the transverse section of the shell is not so trigonal as that represented in Morris's figure; neither have I seen any trace on the internal cast of the obtuse ridges described by that author. The largest measures nearly one and a-half inches in length, somewhat less than the type, and the operculum is five-sixteenths of an inch in its longest diameter.

The present examples were obtained by Mr. Waterhouse at the new shaft of the Maitland Coal Company, between the West Maitland and Farley Railway Stations on the Northern line; and at Silkstone, near Tumbleby, in very hard but similar nodules to the *Conulariæ*, and from a like horizon.

This species is an important one from the fact that it is one of the few Carboniferous forms of its genus. According to Barrande,* Hyolithes does not occur in the Carboniferous, but jumps from the Devonian, to which he referred the present species, to the Permian. The latter formation contains one species, described by Dr. H. B. Geinitz, but it is needless to observe that there are no grounds for placing H. lanceolatus in the Devonian. Prof. K. Zittel, on the contrary, mentions † one Carboniferous species, which is probably the present form.

EXPLANATION OF PLATE.

- Fig. 1.—Conularia inornata, Dana. Portion of a large specimen with the sides of the shell at the upper or proximal end inwardly bent towards the centre. (Nat. size.)
- Fig. 2.—Hyolithes lanceolatus, Morris, sp. An almost complete shell viewed from the convex face. ($\times 2$.)
- Fig. 3.—Side view of the same specimen. $(\times 2.)$
- Fig. 4.—Portion of the external sculpture of the same, highly magnified.
- Fig. 5.—Another example, partially decorticated, with the operculum in situ. (\times 2.)
- Fig. 6.—An isolated operculum seen from above. (×2.)
- Fig. 7.—External sculpture of the same, highly magnified.

^{*} Loc cit. p. 73.

[†] Handbuch der Palaeontologie, 1885, 1 Abth. ii. Bd. p. 316.

DIPTERA OF AUSTRALIA.

By Frederick A. A. Skuse.

PART VII.—THE TIPULIDÆ BREVIPALPI.

(Plates xxi-xxiv.)

The Tipulidæ or Crane-flies constitute a very extensive family, usually characterized by the great length and fragility of their legs, the absence of ocelli, a peculiar structure of the ovipositor, elongated basal cells to the wings, and the presence of a discal cell; but always to be distinguished from every other family in the division by the V-shaped transverse suture on the thorax.

This family is classified under two main divisions, the Tipulidæ Brevipalpi and longipalpi, and two very small intermediate groups. In the first division the terminal joint of the palpi is little if anything longer than the two preceding joints, whilst in the second it is much longer and flagelliform. This peculiarity of the last joint of the palpi is in each division supported by numerous important subsidiary characters, a detailed account of which may be found in the works of Barch Osten-Sacken.

No Australian representatives of the two small intermediate groups, Cylindrotomina and Ptychopterina, have yet been found; the Tipulidæ longipalpi are however well represented, and will form the subject of a future paper.

The present instalment can be only a preliminary contribution to the knowledge of the Australian species of Tipulide brevipalpi; indeed, as can be readily seen, the bulk of the species hereafter treated of are known simply as being denizens of Sydney, the Blue Mountains, and the few other adjacent localities which have received anything approaching special collecting. Beyond

New South Wales the country has not been searched for Tipulidæ; only incidental or conspicuous specimens have been obtained by collectors whose pursuits were more particularly otherwise directed. There is most probably a wealth of material yet to be gathered, but unfortunately the investigators are limited.

The number of species referable to this division of the Tipulidæ, with which Australia has hitherto been credited, altogether does not exceed twenty-three. From this total four names must be sunk as synonyms, whilst a fifth, Gynoplistia constans, Saund., of Walker's list, seems to be that of an undescribed insect; the number being thus reduced to eighteen. This, however, must be supplemented by the names of three characterized species, viz.:—
(1) Gynoplistia annulata, Westw., erroneously described as a native of North America, (2) Libnotes strigivena, Walk., originally found in New Guinea, and (3) Conosia irrorata, Wied., from Java, now recorded from Australia for the first time. To the final total of twenty-one species known to occur in this country, descriptions of about eighty new ones are added in the following pages.

It has been found necessary to introduce five new genera; one each in the sections LIMNOBINA and LIMNOBINA ANOMALA, and three in Eriopterina. Though feeling very reluctant to propose new genera there seems to be no alternative in each case where it has been done. Besides these fresh genera, the genus Geranomyia has been split up into three sub-genera for the reception of species found to possess two-, three-, and four-jointed palpi respectively; also, a sub-genus of Rhypholophus is characterized. The entirety of the species are distributed as follows:—LIMNOBINA [genera Dicranomyia 14, Thrypticomyia (gen.nov.) 1, Geranomyia 4, Limnobia 1, Trochobola 1, and Libnotes 1]; LIMNOBINA ANOMALA [Rhamphidia 4, Orimarga 2, Leiponeura (gen.nov.) 2, and Teucholabis 1]; Eriopterina [Rhypholophus 2, Molophilus 16, Tasiocera (gen.nov.) 2, Erioptera 1, Trimicra 2, Gnophomyia 1, Goniomyia 1, Rhabdomastix (gen.nov.) 1, Lechria (gen.nov.) 1, Trentepohlia 1, and Conosia 1]; LIMNOPHILINA [Limnophila 16, Gynoplistia 18, and Cerozodia 11; and lastly AMALOPINA [genus Amalopis 2]. It is interesting to note in all sections the occurrence of genera common to North America and Europe; and from this we are led to surmise that very probably many other generic forms prevalent in these two continents also have Australian exponents.

Six Australian species have been characterized by former authors, chiefly by Walker, under the generic title Limnobia, but not one of these is a Limnobia; two belong to Trimicra, one to Gnophomyia, two probably to Limnophila, and one to Amalopis. The species of Gnophomyia above referred to is Limnobia fascipennis, Thom., described from a female example; Baron O.-Sacken subsequently described the male of the same species under its correct generic name, but as G. cordialis (Studies II., p. 199, 1887).

Section I. LIMNOBINA.*

"One submarginal cell; four posterior cells. Normal number of antennal joints fourteen (sometimes apparently fifteen). Eyes glabrous. Tibiæ without spurs at the tip. Ungues with more or less distinct teeth on the underside. Empodia indistinct or none." (Osten-Sacken).

A very natural group, including less than a dozen genera, four at least of which, *Dicranomyia*, *Geranomyia*, *Limnobia* and *Trochobola* are cosmopolitan. No species of Limnobina have yet been described from Australia; a fair number are now characterized for the first time, amounting altogether to about one-fourth of the Tipulidæ brevipalpi herein enumerated, a proportion which obtains also in the North American and European faunas.

^{*} For further important particulars about the sections and genera, it is necessary that the student should consult the full descriptions by Baron O.-Sacken extant in his Monograph of the N. American Tipulidæ brevipalpi, also the subsequent observations in his "Studies on Tipulidæ," parts I and II., published in the Berliner Entom. Zeits., 1886 and 1887; without which an adequate knowledge of the groups cannot be expected, but liability to serious blunder certainly the consequence.

Genus 1. DICRANOMYIA, Stephens.

Dicranomyia, Steph., Cat. Brit. Ins. 1829; Osten-Sacken, Mon. Dipt. N. Amer. IV. p. 53, 1869, pl. 1, figs. 1, 2, 3 (wings), and pl. III. figs. 2, 3, 5 (genitalia); Studies II., p. 172, 1887.

"One submarginal cell; four posterior cells; discal cell present or absent; marginal cross-vein at the tip of the first longitudinal vein; tip of the auxiliary vein generally opposite or before the origin of the second longitudinal vein, seldom beyond it. Antennæ 14-jointed, joints sub-globular, elliptical, or short sub-cylindrical. Proboscis not longer than the head. Feet slender, tibiæ without spurs at the tip; empodia indistinct or none. The forceps of the male consists of two movable, soft, fleshy, subreniform lobes and a horny style under them." (Osten-Sacken).

This genus seems to be almost as numerously represented in Australia as it does in N. America and Europe. A few species have been described from New Zealand, one from Java, and one or two from South Africa. *Dicranomyia* also occurs in a fossil state in amber.

In all the specimens of Australian Dicranomyice examined by me, the discal cell is closed. The auxiliary vein usually terminates close to the origin of second longitudinal vein, but in D. obscuripennis and annulipes considerably beyond it; the position of the sub-costal cross-vein varies. In D. incisuralis the sub-costal cross-vein connects the auxiliary vein with the costa. The first longitudinal vein is sometimes arcuated near its tip, thus causing an expansion of the sub-costal cell; this occurs in D. punctipennis, and in a less degree in one or two other species. The first longitudinal vein is continued somewhat beyond the marginal crossvein and joined to the costa by a supernumerary cross-vein in D. saxatilis. In D. Helmsi, marina, remota, obscuripennis, auripennis, zonata, and incisuralis the first longitudinal vein arcuates into the second and appears joined to the costa by a cross-vein. The præfurca is more or less arcuated, sometimes angularly bent near its origin with a small stump of a vein; and it varies in length from once to four times the length of the distance between origin of third longitudinal vein and small cross-vein; in most species it is short. Discal cell more or less square, usually longer than wide; in *D. punctipennis* about four times longer than wide. The great cross-vein usually close to or at the inner end of the discal cell, but in *D. remota* a distance more than its length before it.

290. Dicranomyia punctipennis, sp.n. (Pl. XXI., fig. 1).

Head, including rostrum, palpi and antennæ, brownish-black, the head pruinose with greyish; rostrum rather prominent. Thorax dull dusky brown, pruinose with greyish, with three umber-brown stripes, the lateral ones extending posteriorly beyond the suture; mesosternum dusky brown, pruinose with greyish. Halteres pallid, the club somewhat infuscated. Abdomen dark brown, ovipositor ferruginous-brown. Legs brown; coxe ochraceous; femora more or less ochraceous for their basal half, those of the fore legs often entirely brown. Wings almost hyaline, stigma pale; origin and tip of all veins (except tips of third longitudinal vein and anterior branch of fourth longitudinal vein), and all cross-veins, slightly clouded with dark brown; seventh longitudinal vein somewhat bisinuated, with a very small brown spot on each curve above. Auxiliary vein reaching the costa beyond the origin of the præfurca, sometimes a distance equal to the length of marginal cross-vein; sub-costal cross-vein a little before origin of præfurca; first longitudinal vein suddenly strongly arcuated before its tip, the marginal cross-vein at the middle of this bend, and situated from the tip a distance usually rather greater than its length; the latter consequently shortened and straight; prefurca and that portion of third longitudinal vein before small cross-vein almost in straight line, both distances equal or the first a little longer; small cross-vein very short; discal cell closed, about four times longer than broad, the great cross-vein a little before, at, or somewhat beyond its inner end.

Hab.—Sydney, Berowra, Knapsack Gully, Blue Mountains, and Waterloo Swamps, near Sydney; July to September (Masters and Skuse).

Obs. 1.—I have before me only thirteen specimens of this rather remarkable species. The alar-venation is quite unlike any other species known to me, but somewhat resembles that of *D. longipennis*, Schum (Dipt. N. Amer. IV. pl. 1, f. 1). The wings, however, are of the usual shape.

Obs. 2.—In four specimens recently obtained at Woronora the vein-cloudings are almost entirely absent.

291. DICRANOMYIA SAXATILIS, Sp.n. (Pl. XXI., fig. 2).

Q.—Length of antennæ.... 0.050 inch ... 1.27 millimètres. Expanse of wings.... 0.320×0.085 ... 8.12×2.14 Size of body.... 0.260×0.040 ... 6.62×1.01

Head brown, sericeous with yellowish. Rostrum, palpi and antennæ deep brown; the former shorter than head; joints of antennæ globose, separated by very short pedicels; terminal joint ovate. Thorax brown, sericeous with yellowish, with two small brown spots below the humeri, and two short parallel longitudinal lines having their base on the transverse suture; pleuræ somewhat sericeous with yellowish; scutellum and metathorax dark Halteres pale ochreous-yellow, slightly infuscated. Abdomen dark brown, sparingly clothed with a light pubescence; ovipositor and anal segment ochraceous, the lower valve deep brown at base. Legs ochraceous-brown, all the joints dark brown at the tips; tarsi infuscated. Wings with greyish or brownish cloudings, particularly along the veins; four sub-hyaline spots in the first basal cell, the third extending to and filling the basal half of inner marginal cell; a more or less indistinct sub-hyaline spot at the base of each cell ending at apex of wing; one in discal cell; a small rounded one beyond tip of seventh longitudinal vein; and lastly another small rounded one at the anal angle; stigma scarcely darker than the pale cloudings; veins yellowish-brown.

Auxiliary vein reaching costa a short distance beyond origin of second longitudinal vein; sub-costal cross-vein situated immediately before the origin; first longitudinal vein continued somewhat beyond the marginal cross-vein, joined to costa by a supernumerary cross-vein exactly in line with and half the length of the marginal cross-vein; præfurca arcuated near its base, not quite twice the length of distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein a short distance before its inner end.

Hab.—Near Coogee Bay, Sydney (Skuse). A single specimen. Obs.—The peculiar wing-cloudings, thoracic markings, and character of the first longitudinal vein make this species easily

distinguished.

292. DICRANOMYIA HELMSI, sp.n.

3.	-Length of antennæ	0.050 inch		1.27 millimètres.
	Expanse of wings	0.300×0.080		7.62×2.02
	Size of body	0.240×0.040	•••	6.09×1.01
φ	—Length of antennæ	0.055 inch	• • •	1·39 millimètres.
	Expanse of wings	0.350×0.090		8.87×2.27
	Size of hody	0.290×0.040		7.35×1.01

Head brown, sericeous with yellowish; rostrum, palpi and antennæ black; rostrum in 3 rather shorter than, in Q as long as, the head. Thorax brown, sericeous with yellowish (shining when denuded of the bloom), the sericeous dust thickest at the sides, thus leaving a brownish median stripe; pleuræ, pectus, scutellum and metathorax sericeous with grey. Halteres pale, club infuscated. Abdomen dark brown, with the appearance of a yellowish or yellowish-grey bloom, sparingly clothed with yellowish pubescence; 3 forceps inconspicuous, dark brown; Q ovipositor brownish-ochraceous. Legs blackish-brown, base of femora and the trochanters somewhat testaceous. Wings sub-hyaline, the veins almost imperceptibly clouded with pale greyish; stigma rather long, pale, indistinct; veins cinereous. Auxiliary vein

reaching costa a short distance before origin of second longitudinal vein; sub-costal cross-vein situated before tip of auxiliary vein a distance rather shorter than the length of great cross-vein; first longitudinal vein pale towards its tip, abruptly arcuating into second longitudinal at posterior end of stigma, joined to costa by a short pale cross-vein; præfurca very angularly bent near its base, with a short stump of a vein, and not twice the length of distance between the origin of third longitudinal vein and small cross-vein, in Q only $\frac{1}{3}$ longer than it; discal cell closed, the great cross-vein at its inner end.

Hab.—Mount Kosciusko, N.S.W., 5000 feet; March (Helms). Two specimens in Coll. Australian Museum.

Obs.—I have named this species after its discoverer, Mr. R. Helms, a most enthusiastic and skilful collector, engaged by the Trustees of the Australian Museum.

293. DICRANOMYIA OBSCURA, sp.n.

J.—Length of antennæ Expanse of wings Size of body	0.270×0.065	6.85×1.66
Q.—Length of antenne Expanse of wings	0.280×0.070	$7 \cdot 10 \times 1 \cdot 77$

Head brown, with a yellowish-grey bloom; rostrum, palpi and antennæ black. Thorax greyish-brown, dull, with three brown stripes; intermediate stripe broad, extending from collare to transverse suture; lateral ones apparently not extending beyond the suture; pleuræ with a somewhat yellowish-grey bloom. Halteres yellowish, the club usually infuscated. Abdomen more or less dusky brown; δ forceps and Q ovipositor obscure testaceous. Legs brown, the basal portion of femora ochreous or greyishtawny; tip of tibiæ, and the tarsal joints, infuscated. Wings pellucid with a pale greyish tint, the stigma, cloudings on the

cross-veins, inner end of sub-marginal cells and origin of præfurca, darker greyish; origin of præfurca together with a small portion of first longitudinal vein and the tip of auxiliary vein often stained with deep brown; veins mostly sooty brown, the costa and first longitudinal vein obscure testaceous. Auxiliary vein reaching costa a little beyond origin of præfurca; sub-costal cross-vein near its tip; sub-costal cell uually very slightly wider at tip of first longitudinal vein on account of a slight arcuation of latter; marginal cross-vein a little before tip of first longitudinal vein; præfurca a little arcuated at base, about twice the length of distance between origin of third longitudinal vein and small cross-vein; discal cell closed, twice as long as broad; the great cross-vein situated more or less before its inner end.

Hab.—Sydney and Knapsack Gully, Blue Mountains; July to September (Masters and Skuse).

Obs.—I have five male and eleven female specimens before me for comparison; in one male specimen the wing-spots are entirely absent. This species at first sight closely resembles D. punctipennis.

294. DICRANOMYIA MARINA, sp.n. (Pl. XXI., fig. 3).

- Q.—Length of antennæ...... 0.035 inch ... 0.88 millimètre. Expanse of wings...... 0.250×0.060 ... 6.34×1.54 Size of body..... 0.210×0.030 ... 5.33×0.76

Head brownish, the eyes approximate above; rostrum, palpi and antennæ brownish; rostrum a little longer than the head. Thorax pale dull ochreous-yellow; with three light greyish-brown stripes; posterior portion, with scutellum and metathorax having a hoary bloom. Halteres pale ochreous or whitish. Abdomen dull brown or brownish; δ forceps (Pl. xxiv., fig. 43) and Q ovipositor ochreous or brownish-ochreous; valves of the latter straight. Legs

greyish or greyish-ochreous. Wings with a slightly milky tint, or exhibiting somewhat the appearance of ground glass; viewed at a certain obliquity the veins of anterior margin seem indistinctly lighter at intervals; veins greyish; stigma indistinct. Auxiliary vein reaching costa a little beyond origin of second longitudinal vein; subcostal cross-vein near its tip; first longitudinal vein arcuated into the second, joined to costa by cross-vein; præfurca at least twice the length of distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein situated at or somewhat before its inner end.

Hab.—Manly, near Sydney; March (Skuse).

Obs.—This insect was found very numerously on wet rocks and seaweed which are visited by the ocean spray at low tide and entirely covered by the water at high tide.

295. DICRANOMYIA REMOTA, sp.n. (Pl. XXI., fig. 4).

Q.— Length of antennæ..... 0.050 inch ... 1.27 millimètres. Expanse of wings...... 0.280×0.060 ... 7.10×1.54 Size of body...... 0.260×0.030 ... 6.62×0.76

Head, including rostrum, palpi and antennæ black; the tip of first joint of scapus, the entire second, and first two or three flagellar joints ochreous. Rostrum as long as the head. Thorax fulvous, levigate, with a brown median stripe; posterior portion, scutellum and metanotum pruinose, and except scutellum brownish; pleuræ pale fulvous. Halteres pale, the club infuscated. Abdomen brown, somewhat tinged with fulvous at the base and on the venter; ovipositor ferruginous. Legs light ochreous-brown; coxæ and basal portion of femora pale fulvous. Wings pellucid, clouded with brownish-grey and pale brown; the costal, sub-costal, both marginal cells and the sub-marginal cell almost entirely filled with pale brown; along the præfurca anteriorly, the stigma, and base of sub-marginal cell almost colourless; origin of second and third longitudinal veins, and bases of the branches of the fourth

longitudinal and all the cross-veins clouded with pale brown; posterior portion of wings faintly clouded with brownish-grey. Auxiliary vein reaching costa a little before origin of second longitudinal vein; sub-costal cross-vein situated before tip of auxiliary vein a distance equal to half the length of stigma; marginal cross-vein extremely indistinct, appearing as continuation of first longitudinal vein; præfurca angulated, not quite twice the length of distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein situated before the inner end a distance greater than its length.

Hab.—Middle Harbour, near Sydney; September (Skuse). Obs.—I have taken but one specimen of this species.

296. DICRANOMYIA DORSALIS, sp.n.

♂.—Length of antennæ	0.050 inch	•••	1.27 millimètres.
Expanse of wings	0.280×0.070		7.10×1.77
Size of body	0.210×0.030	•••	5.33×0.76
Q.—Length of antennæ	0.045 inch	•••	1·13 millimètres.
T2 C •			
Expanse of wings	0.280×0.070	•••	$7 \cdot 10 \times 1 \cdot 77$

Head and rostrum brown or yellowish-brown; palpi and antennæ dark brown or black; rostrum shorter than the head. Collare brown. Thorax fulvous or brownish-ochreous, somewhat shining, with three confluent brown or deep brown stripes, the lateral ones extending backwards beyond the suture; scutellum. metathorax and sternum brown or deep brown. Halteres infuscated, the base of the stem ochreous. Abdomen dark brown; 3 forceps ochreous, testaceous or brownish; Q ovipositor short, pale at the base, the valves brown. Coxæ fulvous or ochreous. Remaining joints brown; femora usually paler at the tip; tibiæ and tarsi infuscated. Wings hyaline or nearly so; veins brown; stigma brownish-grey. Auxiliary vein reaching costa opposite or

a little beyond origin of second longitudinal vein; sub-costal cross-vein situated before its tip a distance nearly equal to length of stigma; marginal cross-vein pale, situated at distal end of stigma and tip of first longitudinal vein; præfurca arcuated, about one-third longer than distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein at its inner end.

Hab.—Generally distributed in N.S.W. (Masters and Skuse).

Obs.—In drawing up the above description I have a large series of (nearly one hundred) specimens for comparison. Not a single specimen has the discal cell open.

297. DICRANOMYIA OBSCURIPENNIS, sp.n.

 \bigcirc .—Length of ancennæ.0.065 inch1.66 millimètres.Expanse of wings. 0.250×0.065 6.34×1.66 Size of body. 0.220×0.035 5.58×0.88

Head including rostrum, palpi and antennæ black; face somewhat ochraceous-brown. Joints of antennæ with very short pedicels, becoming slender and elongated towards apex. Thorax brown, sub-levigate; lateral callosity of metanotum and two hind pairs of coxæ ochre-yellow. Halteres black, ochre-yellow at base of stem. Abdomen dark brown, the ventral segments bordered with ochre-yellow posteriorly; ninth segment ochre-yellow; forceps dark brown; fleshy lobes rather small, the rostriform appendage with two long erect bristles. Legs black. Wings pellucid, with a blackish tint; veins and stigma dusky. Auxiliary vein extending beyond the origin of second longitudinal vein half the distance to marginal cross-vein; sub-costal cross-vein near its tip;* first longitudinal vein arcuating into the second longitudinal vein, and connected by the cross-vein to the costa; marginal cross-vein and tip of second longitudinal

^{*}It is difficult to tell which is the cross-vein and which the tip of the auxiliary vein.

cutting middle of stigma; præfurca a little arcuated at base, about three times the length of distance from origin of third longitudinal vein to small cross-vein; sub-marginal cell about $\frac{1}{5}$ longer than the first posterior; discal cell closed, the great cross-vein close to its inner end.

Hab.—Elizabeth Bay, near Sydney (Skuse). August. Obs.—I have obtained only a single specimen.

298. DICRANOMYIA AURIPENNIS, sp.n.

♂.—Length of antennæ	0.050 inch	 1.27 millimètres.
Expanse of wings	0.250×0.060	 6.34×1.54
Size of body	0.210×0.030	 5.33×0.76

Head, including rostrum, palpi, and antennæ black. Rostrum as long as the head. Thorax fulvous or brownish-fulvous, levigate; pleuræ lighter fulvous. Halteres with a slightly infuscated club. Abdomen ochreous-brown, levigate, sparingly clothed with short yellow hairs; forceps brownish-yellow or somewhat fulvous. Legs brown; coxæ and basal portion of femora fulvous or brownish-yellow. Wings pellucid, with a yellowish tint, rather darker along anterior border between first longitudinal vein and costa, on anterior half between second longitudinal vein and costa, and extending downwards to the tip of the latter; brilliant margaritaceous reflections; stigma scarcely distinguishable. Auxiliary vein reaching the costa a little before or opposite the origin of the præfurca; sub-costal cross-vein pale, situated before the tip of auxiliary vein a distance equal to rather more than 2 the length of the præfurca; marginal cross-vein indistinct, close to the tip of first longitudinal vein; the latter appearing as if incurved towards second longitudinal and joined by cross-vein to costa; præfurca about \frac{1}{2} longer than the distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great crossvein before its inner end.

Hab.—Mossman's Bay, near Sydney (Skuse); Blue Mountains, N.S.W. (Masters). September.

Obs.—Two specimens were found at Mossman's Bay in a cave facing the sea, only a single specimen at the Blue Mountains. The tinted and beautifully iridescent wings make this species easily recognised. It is evidently uncommon.

299. DICRANOMYIA ZONATA, sp.n.

 \vec{G} .—Length of antenne — inch ... — millimètres. Expanse of wings..... 0.220×0.055 ... 5.58×1.39 Size of body..... 0.210×0.030 ... 5.33×0.76

Antennæ wanting. Head, including rostrum and palpi, deep brown or black, the front hoary. Rostrum prominent, shorter than head. Thorax light brown, the humeri and posterior half of metanotum ochreous-yellow; a deep brown stripe laterally from collare to base of halteres, bordered beneath (including coxæ) with pale ochre-yellow; the mesosternum deep brown. Halteres deep brown, base of stem pale ochre-yellow. Abdomen deep brown, all segments bordered posteriorly with yellow equally distinctly above and beneath; levigate, with yellowish hairs; forceps deep brown. Legs, including trochanters, deep dusky brown. Wings pellucid, faintly tinged with brownish-grey; stigma elliptical, deep fuscous; veins deep fuscous; apex of wing and cross-veins a little infuscated. Auxiliary vein extending a short distance beyond origin of second longitudinal vein; subcostal cross-vein near its tip; first longitudinal vein ending in second longitudinal, connected by an indistinct cross-vein to costa scarcely beyond middle of stigma; præfurca moderately long, almost rectangularly bent near its origin, with a stump of a vein at the angle; sub-marginal cell about 1 longer than first posterior cell; discal cell closed, the great cross-vein close to its inner end.

Hab.—Blue Mountains, N.S.W. (Skuse). One specimen.

300. DICRANOMYIA INCISURALIS, sp.n.

Q.—Length of antennæ..... 0.040 inch ... 1.01 millimètres. Expanse of wings..... 0.210×0.050 ... 5.33×1.27 Size of body..... 0.200×0.025 ... 5.08×0.62

Head brown, pruinose with yellowish. Rostrum, palpi and antennæ black. Thorax ochreous with three brown stripes, lateral ones extending posteriorly beyond the suture; pleuræ with a brown stripe from beneath the humeri to the base of the halteres; prosternum with an oblong brown spot between the fore coxæ; mesosternum with two oblong brown spots between the intermediate coxæ; scutellum and metanotum brown or brownish. teres ochreous, the club infuscated. Abdomen brown; incisions between the superior segments ochreous-yellow, widened into roundish patches on the venter; ovipositor brownish-ferruginous, lower valves deep brown or black at the base, ochreous-yellow before their insertion. Legs brown; coxæ ochreous; femora pale at base and somewhat darker at apex. Wings pellucid with a pale brownish tint, the origin and tip of second longitudinal vein, origin of third longitudinal and the cross-veins somewhat clouded with brownish; stigma roundish, brown, very distinct. Auxiliary vein reaching the costa a little beyond the origin of second longitudinal vein, appearing as if incurved towards first longitudinal vein and connected before its tip by the cross-vein to costa; first longitudinal vein arcuated into the second longitudinal vein through the middle of stigma, and joined to costa by cross-vein; præfurca, also third longitudinal vein, angularly bent near the base (remaining portion almost straight), with a small stump of a vein at the angle (these small stumps are exhibited in all three specimens before me); præfurca varying from 21 to nearly 4 times the length of distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein before or at its inner end.

Hab.—Wheeney Creek, Hawkesbury Dist. (Skuse); Sydney and Berowra (Masters). January.

Obs.—A single specimen was taken in each of the above-named localities. Closely allied to D. zonata, but certainly distinct.

301. DICRANOMYIA VIRIDIVENTRIS, Sp.n.

♂.—Length of antennæ	0.040 inch	•••	1.01 millimètres.
Expanse of wings	0.250×0.050		6.34×1.27
Size of body	0.180×0.025	•••	4.56×0.62

Head yellowish to brownish; rostrum shorter than the head, yellowish to brownish; palpi and antennæ brown; the first joint of scapus sometimes ochreous. Thorax pale greenish-yellow, sometimes darker (in one specimen even reddish-brown), shining, with indistinct traces of an intermediate stripe. Halteres pale green, the club very slightly darker. Abdomen green; & forceps usually concolorous with rest of abdomen; o ovipositor short, ochreousbrown. Legs yellowish or greenish-yellow; tibiæ and tarsi grevish. Wings hyaline; veins brownish; stigma grevish, sometimes indistinct. Auxiliary vein reaching costa opposite or somewhat before origin of second longitudinal vein; sub-costal cross-vein situated more than half the length of stigma distant from its tip; marginal cross vein at tip of first longitudinal vein; præfurca arcuated, only a little longer than distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein at or somewhat beyond its inner end.

Hab.—Middle Harbour, near Sydney (Skuse). Three specimens.

Obs.—Three specimens captured by me at Knapsack Gully, Blue Mountains, appear to belong to this species, but they are too shrivelled to satisfactorily examine.

302. DICRANOMYIA CUNEATA, sp.n. (Pl. XXI., fig. 5).

3.— Length of antennæ	0.035 inch	 0.88 millimètre.
Expanse of wings	0.200×0.045	 5.08×1.13
Size of body	0.140×0.016	 3.55×0.40

Front, antennæ, and palpi brown; rostrum yellowish; terminal joint of antennæ with a slender cylindrical prolongation. Thorax pale brownish-ochreous, sub-nitidous; pleuræ paler ochreous, with an almost imperceptible greenish tint. Halteres long (1.01 mm.), slender, infuscated, pale at the base of stem. Abdomen olivebrown, the forceps very little paler. Legs dusky brown, the coxæ and extreme base of femora pale greenish-ochreous. Wings narrow, lanceolate, almost hyaline, with a slight greyish tint; stigma almost invisible; veins brown. Auxiliary vein reaching costa a little beyond origin of second longitudinal vein; sub-costal cross-vein situated before the tip of auxiliary vein a distance equal to rather more than half the length of prefurca; marginal cross-vein situated at tip of first longitudinal vein; præfurca about 21 times the length of distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein at or before its inner end.

Hab.—Blue Mountains N.S.W. (Skuse). One specimen.

Obs.—The wings are considerably broader at the apex than those of *D. longipennis*, Schum; the basal portion is similar. The above-described appears closely allied to *D. halterata*, O.S. (Dipt. N. Amer. IV. p. 71).

303. DICRANOMYIA ANNULIPES, sp.n.

 \mathcal{J} .—Length of antennæ.0.040 inch1.01 millimètres.Expanse of wings. 0.210×0.055 5.33×1.39 Size of body. 0.140×0.025 3.55×0.62

Head, including rostrum, palpi and antennæ, deep brown, almost black. Thorax dull brown, somewhat sericeous on posterior portion, and also on scutellum and metanotum; pleuræ dull brown. Halteres fulvous. Abdomen ochreous-brown, the segments bordered at the sides with brown, tolerably well clothed with yellow hairs; forceps bright fulvous. Legs pale ochreous-brown; femora with a darker ring before apex, slightly paler a little before and after the ring; tibiæ and all tarsal joints tipped with deep brown

or black. Wings pellucid, with a slightly greyish tint, and rather indistinctly clouded with brownish; two very pale spots in first basal cell, one mid-way between humeral cross-vein and origin of præfurca, the other immediately beneath origin of præfurca; bases and tips of all the veins, and the cross-veins, more or less distinctly clouded; stigma elliptical, pale brownish; veins dark brown, the costa more fulvous. Auxiliary vein reaching the costa beyond the origin of second longitudinal vein a distance about equal to length of stigma; sub-costal cross-vein about midway between origin of second longitudinal vein and tip of auxiliary vein; marginal cross-vein close to tip of second longitudinal vein; præfurca about twice the length of the distance between origin of third longitudinal vein and small cross-vein; discal cell closed, the great cross-vein a little before its inner end.

Hab.—Hexham Swamps, near Newcastle, N. S. W.; April (Skuse).

Genus 2. Thrypticomyia, gen. nov.

One sub-marginal cell; four posterior cells; discal cell present; marginal cross-vein before tip of first longitudinal vein; tip of auxiliary vein opposite origin of second longitudinal vein; præfurca as long as sub-marginal cell; a supernumerary cross-vein between the costa and the auxiliary vein. Wings lanceolate, very narrow towards the base. Antennæ 14-joined, joints sub-cylindrical; joints pedicelled; each joint with a moderately long stiff hair above (Pl. xxiv, fig. 45). Proboscis very short. Feet slender; tibiæ without spurs; ungues extremely minute with a tooth near the base; empodia wanting. Forceps of male similar to those of *Dicranomyia* (Pl. xxiv, fig. 44); two fleshy lobes with a horny style under them.

This genus though undoubtedly very closely allied to *Dicranomyia* may be readily distinguished by the structure of the antennæ, the cuneiformly narrowed base of the wings which has not the slightest indication of an anal angle, by the greater length of the first longitudinal vein and position of the marginal crossvein, and lastly by the presence of a supernumerary sub-costal cross-vein.

304. Thrypticomyia aureipennis, sp.n. (Pl. XXI., fig. 6).

G.—Length of antennæ.... 0.050 inch ... 1.27 millimètres. Expanse of wings..... 0.190×0.040 ... 4.81×1.01 Size of body..... 0.165×0.020 ... 4.18×0.50

Head and antennæ brown; rostrum and palpi ochreous or brownish. Thorax short and arcuated, light ochreous-brown, somewhat darker in the mesonotum; sub-levigate. Halteres long, slender, infuscated, pale at the base of stem. Abdomen including forceps brown. Legs very slender. Coxæ and extreme base of femora ochreous; remaining joints brown, the tip of first tarsal joint and whole of last four joints white. Wings sub-hyaline, with extremely brilliant, chiefly golden, reflections; veins and stigma brown. Auxiliary vein reaching costa opposite origin of second longitudinal vein; sub-costal cross-vein a short distance (the length of marginal cross-vein) from its tip; supernumerary cross-vein situated about opposite inner end of first posterior cell; first longitudinal vein disappearing before end of stigma, the latter enveloping this vein from opposite inner end of sub-marginal cell; marginal cross-vein situated before tip of first longitudinal vein a distance at least equal to its length; præfurca slightly arcuated at its origin; discal cell usually longer than broad, sometimes nearly square; its inner end usually somewhat before inner end of first posterior cell, and its anterior angle sometimes with a small stump of a vein; great cross-vein situated about its middle.

Hab.—Sydney; six specimens (Masters).

Obs.—This insect has a very delicate aërial appearance.

Genus 3. Geranomyia, Haliday.

Geranomyia, Hal., Entom. Mag. I. p. 154, 1833; Curtis, Brit. Entom. XII. p. 573, 1835; Limnobiorrhynchus, Westw., Ann. Soc. Ent. Fr. 1835, p. 684; Trans. Ent. Soc. Lond. 1881, p. 375; Aporosa, Macquart, Dipt. Exot. I., p. 62, 1838; Loew, Linn. 50

Entom. V. p. 394, tab. II. f. 9-12, 1851; Geranomyia, Hal., Ins. Brit. iii. p. 310, 1856; Plettusa, Philippi, V. z.-b. G. Wien, p. 597, t. xxIII. f. 1, 1865; Geranomyia, O.-Sacken, Mon. Dipt. N. Amer. IV. p. 78, 1869; Wulp, v.d., Dipt. Neerl. p. 396, t. xII., f. 5-6, 1877; O.-Sacken, Studies, II. p. 173, 1887.

"One sub-marginal cell; four posterior cells; a discal cell. Antennæ 14-jointed, sub-moniliform; joints not pedicelled. Rostrum and proboscis prolonged, longer than the head and thorax taken together; the short palpi inserted about their middle. Feet slender; tibiæ without spurs at the tip; empodia indistinct or none; ungues with teeth on the under side. The forceps of the male like that of *Dicranomyia*, and consists of two fleshy, movable lobes, with horny appendages and a horny style under them." (Osten-Sacken).

Four species which I refer to this genus differ in the number of joints to the palpi; one species has only biarticulate palpi, two have them 3-jointed, whilst another has them 4-jointed. These differences compel me to suggest the institution of three subgeneric groups; in other respects these insects do not more than specifically differ from hitherto described Geranomyia. There has always seemed some doubt about the number of joints to the palpi. Haliday first of all believed them to consist of but one minute joint. Baron Osten-Sacken takes them to be biarticulate on the authority of Curtis; but the latter author himself queries the statement in his generic diagnosis. Having not a specimen of any described species it is impossible for me to more than surmise that upon careful examination the known examples, of which the majority prevail on the American continent, will be found to differ in the number of joints comprised in the palpi. The type of the genus, G. unicolor, Hal., probably has, but possibly may not have, only biarticulate palpi; and Curtis errs when he states that they are "attached to the anterior angles of the mentum." They are in reality attached to the sides of the labium below the point where the latter divides. The labium with the palpi can be drawn away from the other organs upon careful dissection.

Rostrum the length of the thorax only in *G. lutulenta* and annulata; as long as the thorax and head taken together in *G. picta* and fusca. Antennæ rather short, joints elliptical, sessile; subcylindrical in *G. fusca*. The basal joint of the palpi is always long and slender, about twice the length of the second joint (Pl. xxiv., figs. 46-48).

Venation similar to that of *Dicranomyia*. Auxiliary vein in *G. picta* reaching costa nearly opposite but somewhat beyond origin of præfurca, in the other species reaching considerably beyond. Sub-costal cross-vein always close to the tip of the auxiliary vein. The second longitudinal vein is rather angularly bent near its origin in the four species known to me, in *G. picta* and *annulata* with even a short stump of a vein at the angles. The sub-marginal cell is much longer than the first posterior cell. The discal cell is open in one specimen of *G. lutulenta*, and coalesces with the *third* posterior cell. In *G. picta* the great cross-vein is situated considerably before the inner end of discal cell.

In the male forceps the rostriform appendage of the fleshy lobes bears two short stiff bristles; in *G. fusca* this is situated much lower down the lobe than usual. The falciform appendages are long and curved. The anal style is large in *G. picta* (Pl. xxiv., fig. 49), but small and hammer-shaped in *fusca* (Pl. xxiv., fig. 50). These differences however may be only of specific importance.

Until further species have been studied it is impossible to fully define the three following sub-genera; other characters may be ultimately found to be constantly associated with the differences in the palpi.

- 1. Sub-genus *Geranomyia*. Palpi two-jointed. Proposed for the single species *G. picta* (Pl. xxiv., fig. 46).
- 2. Sub-genus *Triphana*. Palpi three-jointed. Proposed for the reception of two species, *G. lutulenta* and *annulata* (Pl. xxiv. fig. 47).

3. Sub-genus *Tetraphuna*. Palpi four-jointed. One species, *G. fusca* (Pl. xxiv., fig. 48).

305. GERANOMYIA (GERANOMYIA) PICTA, sp.n.

∂.—Length of antennæ 0.060 inch	. 1.54 millimètres.
Expanse of wings 0.220×0.050	5.58×1.27
Size of body 0.240×0.030	6.09×0.76
Q.—Length of antennæ 0.050 inch	. 1·27 millimètres.
Expanse of wings 0.240×0.050	6.09×1.27
Size of body 0.210 × 0.030	. 5·33 × 0·76

Head, including proboscis, palpi and antennæ black; front with a greyish bloom. Palpi two-jointed. Collare brown Thorax fulvous-brown, with a greyish bloom, traversed by three brown longitudinal stripes; the intermediate stripe extending to posterior border of metanotum, Halteres with infuscated club. Abdomen brown, ochreous or fulvous-brown on the venter; genitalia fulvous or brownish-ochreous. Coxæ fulvous; femora testaceous, darker at the tip; tibiæ and tarsi obscure testaceous, the terminal joint of latter infuscated. Wings pellucid, with a slight tint; the stigma and two spots on the distal half of anterior border brown; a small squarish spot at origin of præfurca, and a longish one on the costa beginning a short distance beyond stigma, and terminating at tip of third longitudinal vein; the cross-veins, inner ends of sub-marginal and sub-costal cells and fifth longitudinal vein clouded. Auxiliary vein reaching costa a little beyond origin of second longitudinal vein; prefurca angularly bent near its origin, generally with a small stump of a vein; marginal cross-vein and tip of first longitudinal vein pale, the latter arcuated into second longitudinal; sub-marginal cell nearly one-third longer than the first posterior; discal cell closed; the great cross-vein situated much before its inner end, and usually opposite inner end of first sub-marginal cell.

Hab.—Knapsack Gully, Blue Mts.; North Waratah, near Newcastle, and Middle Harbour, near Sydney; six specimens (Skuse).

306. GERANOMYIA (TRIPHANA) LUTULENTA, sp.n.

Brown. Head including rostrum, palpi and antennæ black; front with a greyish bloom. Palpi three-jointed. Thorax levigate, more or less ochreous or ochreous-brown at humeri; pleuræ with greyish bloom. Halteres infuscated, the base of stem ochreousyellow. Ovipositor obscure testaceous. Coxæ and femora testaceous, the latter brown at the tip; tibiæ and tarsi obscure testaceous or brownish, all the joints tipped with brown; except the last three tarsal joints entirely blackish. Wings with a slightly greyish tint, with small indistinct greyish cloudings; stigma same tint as clouds; first and fifth longitudinal veins marked with brown near the base of wing; a squarish greyish cloud at origin of second longitudinal vein reaching costa anteriorly and fourth longitudinal vein posteriorly; a small cloud enveloping tip of auxiliary vein and neighbouring portion of the first longitudinal vein; a roundish cloud at base of sub-marginal cell, enveloping extremity of præfurca, and coalescing with stigma; cross-veins and both ends of discal cell also clouded; veins brown, the costa and first and fifth longitudinal veins yellowish, but the first longitudinal brown where enveloped by cloudings. Auxiliary vein reaching costa opposite middle of præfurca; sub-costal cross-vein a short distance from its tip; præfurca angulated near its origin; discal cell closed, or opened posteriorly; the great cross-vein at or before its inner end.

Hab.—Mount Kosciusko, N.S.W., 5000 ft.; March (Helms). Two specimens in Coll. Australian Museum.

Obs.—This is the only species in which I have observed the discal cell open among all the Australian LIMNOBINA examined by me.

307. GERANOMYIA (TRIPHANA) ANNULATA, sp.n.

 \mathcal{J} .—Length of antennæ.0.050 inch1.27 millimètres.Expanse of wings. 9.280×0.065 7.10×1.66 Size of body. 0.250×0.030 6.34×0.76

Head, including proboscis, palpi and antennæ dusky brown. Palpi three-jointed. Thorax fulvous-brown, shining, with three brown stripes; the intermediate stripe terminating before the suture; metathorax with hoary bloom; collare and pleuræ brown. Halteres with infuscated club. Abdomen brown; the forceps paler. Legs testaceous; fore femora with a brown ring at the tip, the intermediate and hind pairs with a narrow ring before the tip; terminal joints of tarsi somewhat infuscated. Wings almost hyaline; stigma and two spots brownish; the spots small, cloud-like; one at origin of second longitudinal vein, and the other enveloping tip of auxiliary vein, the sub-costal cross-vein and portion of first longitudinal; inner end of sub-marginal cell and veins indistinctly clouded. Auxiliary vein reaching costa nearer opposite inner end of sub-marginal cell than to origin of second longitudinal vein, and opposite tip of sixth longitudinal vein; sub-costal cross-vein close to its tip; præfurca angularly bent near its origin, with a short stump of a vein; tip of first longitudinal and marginal crossvein pale, the former apparently very abruptly arcuated into second longitudinal vein; sub-marginal cell nearly one-fifth longer than first posterior cell; discal cell closed; the great cross-vein situated before its inner end a distance less than its length, and opposite inner end of sub-marginal cell.

Hab.—Berowra, N.S.W.; a single specimen (Skuse).

308. Geranomyia (Tetraphana) fusca, sp.n.

 $\overrightarrow{\mathcal{S}}$.—Length of antennæ....0.070 inch1.77 millimètres.Expanse of wings..... 0.310×0.080 ... 7.87×2.02 Size of body...... 0.250×0.040 ... 6.34×1.01

Q.—Length of antenne..... 0.065 inch ... 1.66 millimètres. Expanse of wings..... 0.320×0.080 ... 8.12×2.02 Size of body...... 0.290×0.040 ... 7.35×1.01

Dark brown. Head, including proboscis, palpi and antennæ sometimes black. Palpi four-jointed. Thorax light brown at the humeri; an intermediate brown stripe visible anteriorly. Halteres brown, somewhat ochreous at the base of stem. Abdomen blackish-brown; & forceps concolorous with rest of body; Q ovipositor rather short, straight, the valves obscure testaceous. Legs entirely brown. Wings with a slight greyish tint, with very pale greyish-brown clouds; the stigma slightly darker; a squarish cloud at origin of second longitudinal vein, reaching costa anteriorly and fourth longitudinal posteriorly; a cloud between stigma and lower extremity of great cross-vein; and another at distal end of discal cell; the costa at end of marginal and sub-marginal cells somewhat clouded; veins dark brown. Auxiliary vein reaching costa more or less opposite middle of præfurca; sub-costal cross-vein near its tip; tip of first longitudinal and the marginal cross-vein pale; præfurca much angulated near its orgin; great cross-vein at inner end of discal cell.

Hab.—Lawson, Blue Mountains, N.S.W. (Masters). January.

Genus 4. Limnobia, Meigen.

Limnobia, Meig., Syst. Beschr. I. p. 116, 1818; Limonia, Meig., Ill. Mag. II. p. 262, 1803; Limnobia and Glochina, Meig., Syst. Beschr. VI. pp. 275-280, 1830; Idioptera, Limnophila, and Limnobia, Macquart, S.à B. I. pp. 94, 95, 100, 1834; Walker, Ins. Brit. III. p. 280, 1856; Zetterstedt, F. Lapp. 1840, Dipt. Scand. X. 1851; Limnobia (in its restricted sense), Stephens, Cat. Brit. Ins. 1829; O.-Sacken, Mon. Dipt. N. Amer. IV. p. 84, 1869; Studies, II. p. 177, 1887.

"One submarginal cell; four posterior cells; a discal cell. The marginal cross-vein is sometimes at the tip of the first longitudinal

vein, but often at some distance anterior to this tip, crossing the stigma; the tip of the auxiliary vein is usually far beyond the origin of the prefurca. Antennæ 14- (often apparently 15-) jointed. Feet comparatively strong; tibiæ without spurs at the tip; empodia indistinct or none; ungues with several teeth on the under side, giving them a pectinate appearance. The forceps of the male consists of two horny, movable hooks, and a horny style under them." (Osten-Sacken).

The species hereafter described seems to differ from typical Limnobiæ in having the general appearance of a Dicranomyia, being of moderate size, dull-coloured, etc.; also, the ungues do not exhibit a pectinate appearance, showing only indistinctly two minute teeth near the base. It is all the more remarkable that this species should be so Dicranomyia-like, as it belongs to the section having the cross-vein close to the tip of the first longitudinal vein, this latter character being always associated with the typical highly coloured Limnobiæ,* whilst in antennæ, structure of male forceps, and length of auxiliary vein it is a true Limnobia.

309. LIMNOBIA BIDENTATA, sp.n.

♂.—Length of antennæ	0.070 inch	•••	1.77 millimètres.
Expanse of wings	0.300×0.080		7.62×2.02
. Size of body	0.310×0.040		7.87×1.01
Q.—Length of antennæ	0.070 inch		1.77 millimètres.
Expanse of wings	0.320×0.085		$8 \cdot 12 \times 2 \cdot 14$
Size of body	0.310×0.042		7.87×1.06

Head, including rostrum, palpi and antennæ black; rostrum short; first joint of scapus twice the length of the second. Thorax dark fuscous-brown, sometimes almost black with a greyish bloom; pleuræ and humeri sometimes slightly tinged with testaceous. Halteres testaceous, the club almost black. Abdomen

^{*} Though also a character of the Dicranomyia.

deep brown or black, sparingly clothed with very short yellowish hairs; & forceps (Pl. xxiv., fig. 51) concolorous with rest of body; Q ovipositor rather slender, slightly curved, the valves reddishbrown. Legs obscure testaceous; femora with a broad ring of brown at tip; tibiæ and first two tarsal joints slightly tipped with, and three last joints entirely, brown or black. Wings pellucid, with brownish tint; veins dark fuscous-brown, the præfurca and cross-veins clouded with brownish; costal cell, and distal half of marginal cell, also brownish; stigma small, round, dark fuscous, enveloping the tip of first longitudinal and marginal cross-vein. Auxiliary vein reaching costa opposite inner end of sub-marginal cell; sub-costal cross-vein close to its tip; first longitudinal vein abruptly arcuated into the second, joined to the costa by the cross-vein; the latter rather indistinct and pale; præfurca arcuated, sometimes with a small stump of a vein, about one-third longer than distance from origin of third longitudinal vein to small cross-vein; great crossvein situated more or less before middle of discal cell; sixth longitudinal vein straight or nearly so; seventh a little arcuated at the tip.

Hab.—Gosford, Woronora and Manly, near Sydney (Skuse); Blue Mts. (Masters). January to March. Eighteen specimens.

Genus 5. TROCHOBOLA, Osten-Sacken.

Discobola, O.-Sack., Proc. Ent. Soc. Philad. p. 226, 1865;
Trochobola, O.-Sack., Mon. Dipt. N. Amer. IV. p. 97, 1868;
Studies, II. p. 178, 1887.

"One sub-marginal cell; four posterior cells; a discal cell; the tip of the auxiliary vein is far beyond the origin of the second longitudinal vein; the marginal cross-vein is some distance anterior to the tip of the first longitudinal vein; a supernumerary cross-vein connects the sixth and seventh longitudinal veins. Antennæ 14-jointed. Feet slender; tibiæ without spurs at the tip; empodia indistinct; ungues with teeth on the under side." (Osten-Sacken).

Three species belonging to this genus have been described, two occurring in Europe and one in North America; and according to Baron Osten-Sacken the genus also occurs in New Zealand. All known species exhibit a wonderful similarity and are difficult to separate; the wings are marked with numerous ocellate spots which vary little more in the different species than they do in individuals.

Prof. Mik (Verh. z.-b. Ges. in Wien, XXVIII. p. 617, 1879) discusses the described species, and establishes the distinction between the two European species by the structure of the male forceps and character of the wing-markings.

The species now described from Australia seems more closely related to T. cesarea, O.-Sack., than to annulata, Linn. They agree very well in the picturing of the wings, except that T. australis has not the marmorated second basal cell so characteristic of cesarea. The auxiliary vein (judging by Prof. Mik's figures) is not so long, the second longitudinal vein is more arcuated, and the third longitudinal vein more strongly converges towards the fourth. On the other hand, the structure of the holding forceps is more like that of T. annulata, possessing the rostriform appendage; it differs, however, in having the upper margin of the anal segment emarginate, and not dentate as in both European species.

310. TROCHOBOLA AUSTRALIS, sp.n. (Pl. XXI., fig. 7).

 \mathcal{J} .—Length of antennæ.....0.070 inch...1.77 millimètres.Expanse of wings...... 0.340×0.080 ... 8.62×2.02 Size of body 0.250×0.030 ... 6.34×0.76

Head, including rostrum, palpi and antennæ, black. Collare ochreous-yellow. Thorax ochreous-yellow, almost covered with three broad brown stripes, levigate; pleuræ and metathorax dark brown; scutellum deeply bordered with brown. Halteres brown, the club and base of stem pale. Abdomen brown or brownish-ochreous (greenish-yellow while living), the first segment ochreous

yellow; genitals concolorous with rest of abdomen; fleshy lobes of & forceps (Pl. xxiv., fig. 52), with a short rostriform appendage, the upper margin of horny plate between bases of basal pieces with a shallow emargination (not dentate as in T. annulata and cæsarea). Legs testaceous; femora with a brown or black ring before the tip, preceded and followed by ochreous-yellow; tip of tibiæ and terminal joints of tarsi brown or black. Wings broad, with a pale yellowish tint, with brown (blackish while fresh) ocellate cloudings; the greater portion of second basal cell, and a transverse recurved band across the middle of wing, clear of markings (except that there is the pupil of an incomplete ocellus at tip of sixth longitudinal vein); an almost complete ocellus, broken at the costa, has its pupil at the origin of second longitudinal vein; another almost complete one has the supernumerary cross-vein for its centre; the distal half of the wing is covered with more or less confluent ocelli, the centre spots of the most distinct being at sub-costal cross-vein, small crossvein, basal half of great cross-vein and the cross-vein closing discal cell; a brown spot on the costa near base of wing encloses a pale spot at or somewhat beyond the humeral cross-vein; and another enveloping tip of first longitudinal and marginal cross-vein has a pale spot just before the tip of the former. Auxiliary vein reaching costa a short distance before inner end of sub-marginal cell; subcostal cross-vein a short distance before its tip; first longitudinal vein arcuated towards its tip, forming a considerable expansion of the sub-costal cell; third longitudinal vein considerably converging towards the fourth at its tip.

Hab.—Sydney and Como, N.S.W. (Skuse); Waverley, near Sydney; October (Froggatt). Three male specimens.

Obs.—Baron O.-Sacken remarks that he knows at least three easily distinguishable species from S. E. Australia and New Zealand; the above-described is unfortunately the only one I have been able to find, and that only rarely.

Genus 6. LIBNOTES, Westwood.

Libnotes, Westw., Trans. Ent. Soc. Lond. 1876, p. 505, pl. III. fig. 6 b.; O. Sacken, Studies II., p. 179, 1887.

One submarginal cell; four posterior cells; a discal cell; cells at distal half of wing of remarkable length and curvature; præfurca extremely short. Marginal cross-vein at or near the tip of the first longitudinal vein; the tip of the auxiliary vein far beyond the origin of the præfurca. Antennæ 14-jointed, the terminal joint with a slender elongation. Legs long, slender; tibiæ without spurs at the tip; empodia wanting; ungues dentate. Male forceps of similar structure to those of Limnobia.

311. LIBNOTES STRIGIVENA, Walker (Pl. XXI., fig. 8).

Limnobia strigivena, Walk., Journ. Linn. Soc. Lond. Vol. V., 1861, p. 229; Libnotes strigivena, O.-Sacken, Studies II., 1887, p. 183.

- ♂.—Length of antennæ..... 0.080 inch ... 2.02 millimètres. Expanse of wings...... 0.600×0.095 ... 15.24×2.39 Size of body 0.350×0.055 ... 8.89×1.39
- Q.—Length of antennæ..... 0.080 inch ... 2.02 millimètres. Expanse of wings..... 0.500×0.095 ... 12.70×2.39 Size of body..., 0.350×0.055 ... 8.89×1.39

Pale ochreous-yellow. Antennæ and palpi somewhat tinged with brownish; flagellar joints elliptical. Thorax, with the mesonotum, and lateral border to origin of wings, brown; more or less distinct traces of a double median stripe; a brownish triangular spot on each side above the origin of the wings; a small spot about equal in size to the last on the pleuræ; metanotum with a narrow lateral border of brown, which is continued as a brown line down the sides of the abdominal segments*; second segment with a median brownish marking; Q ovipositor short, little curved, ochraceous-brown. Fore coxæ bordered with brown anteriorly; femora with a more or less distinct brown ring a little before the

^{*} The lateral line and thoracic markings are occasionally very indistinct, whilst in old specimens the sides of the segments of the abdomen sometimes overlap, and thus entirely conceal the line.

apex; tibiæ and first two tarsal joints at tip, and last three joints entirely, brown or blackish. Wings almost hyaline, somewhat opaline; veins pale ochreous (imparting a somewhat whitish appearance to the wings), marked with numerous small longitudinal brown spots, the two most distinct on the first longitudinal vein at origin of second longitudinal and tip of auxiliary vein; distal end of stigma, with tip of first longitudinal vein, slightly infuscated. Auxiliary vein joining costa almost opposite tip of fifth longitudinal vein; sub-costal cross-vein at its tip; marginal cross-vein close to tip of first longitudinal vein; inner end of second posterior cell much arcuated or rectangular, situated much before that of the third, with slight trace of a small stump of a vein at its angle; discal cell long and narrow, the great cross-vein at about one-third its length.

 ${\it Hab.}$ —Barron and Mulgrave Rivers, N. Queensland (Froggatt); also Fiji Islands. Five specimens.

Obs.—I believe this insect to be the same as L. strigivena, described by Walker, from Dorey, New Guinea. In arriving at this conclusion I have been greatly assisted by the additional notes on the venation of the wings in the table given by Baron O.-Sacken, (Studies, II. p. 183). A single specimen in the Macleay Museum labelled "Fiji," is undoubtedly identical with the above. Some very large specimens, also from the same locality, may possibly belong to a different species, but the venation and markings are very similar.

Section III. LIMNOBINA ANOMALA.

"One sub-marginal cell; normal number of the antennal joints sixteen." (Osten-Sacken).

An artificial group, proposed by Baron Osten-Sacken, to include certain genera, the structural relation of which, one to another, is in many instances obscure, if not distant. The normal number of joints of the antennæ is sixteen, as in the ERIOPTERINA and LIMNOPHILINA; but the tibiæ are spurless and the wings possess

only a single sub-marginal cell, both characters of the Limnobina. Again, unlike the latter some of these genera exhibit distinct empodia, whilst, on the other hand, some do not have them. In short, although these genera appear, and probably are, arbitrarily grouped together, they certainly cannot be admitted elsewhere; but in the present state of our knowledge the section is at least a convenient one.

Genus 7. RHAMPHIDIA, Meigen.

Leptorhina, Stephens, Catal. etc. 1829; Megarhina, St. Fargeau, Encycl. Meth. Ins. X., p. 585, 1825; Helius, St. Fargeau. l.c. Index, p. 831; Rhamphidia, Meig., Syst. Beschr. VI. p. 281, 1830; Macquart, S. à B. Dipt. I. p. 93, 1834; Walker, Ins. Brit. III. p. 308, 1856; Schiner, F. A., 1864; Osten-Sacken, Mon. Dipt. N. Amer. IV. p. 103, 1869; Studies II. p. 183, 1887.

"One sub-marginal cell; four posterior cells; a discal cell; no marginal cross-vein. The tip of the auxiliary vein is at some distance beyond the origin of the second vein; the sub-costal cross-vein is close at this tip. Rostrum elongated, but shorter than the thorax; last joint of the palpi elongated. Antennæ 16-jointed. Tibiæ without spurs at the tip; empodia indistinct; ungues smooth. The forceps of the male very like that of Elephantomyia." (Osten-Sacken).

The rostrum is much longer than the head in three out of the four species known to me; in $R.\ niveitarsis$ only a little longer.

Only a few species of this genus are known, all, I believe, American and European. Four fossil species are stated by Loew to occur in Prussian amber (Bernst. und Bernstein fauna, 1850, p. 37).

312. Rhamphidia communis, sp.n. (Pl. XXI., fig. 9).

- Q.—Length of antennæ..... 0.060 inch ... 1.54 millimètres. Expanse of wings...... 0.380×0.090 ... 9.64×2.27 Size of body...... 0.340×0.050 ... 8.62×1.27

Head, including rostrum, palpi and antennæ, black; the rostrum $2\frac{1}{2}$ - 3 times the length of head. Thorax dark brown or fuscous, levigate, with four fulvous brown stripes; intermediate pair beginning at anterior border, coalescing at or a little before transverse suture and continuing to the scutellum; lateral ones broader, starting below the humeral pits, reaching a short distance beyond the suture, and opposite origin of wings; pectus, scutellum and posterior portion of metanotum sometimes more or less fulvous. Halteres yellow. Abdomen dark brown or fuscous, the segments bordered posteriorly with yellowish; genitalia brownish or yellowishbrown. Legs brown; femora becoming deep brown before tip; the tip of femora and extreme base of tibiæ yellow. Wings pellucid, with a pale brownish tint; veins, especially those enclosing discal cell, and the origin of præfurca, slightly clouded with brownish; yellow between costal and first longitudiual veins; veins and stigma dark fuscous; the later oblong. Auxiliary vein reaching costa a little before or opposite inner end of sub-marginal cell; sub-costal cross-vein at its tip, sometimes apparently obsolete; præfurca nearly straight; small cross-vein about half the length of the inner end of the second posterior cell; discal cell longer than broad, the great cross-vein at or a little beyond its inner end.

 ${\it Hab}.$ —Generally distributed in N.S.W.; September to April (Masters and Skuse).

Obs.—I have a series of about forty specimens for comparison. In some examples the light brown stripes on the thorax are very distinct, whilst in others the thorax is of a uniform dark brown with very faint or no traces of stripes.

313. Rhamphidia fulvithorax, sp.n.

♂.—Length of antennæ	0.050 inch		1.27 millimètres.
Expanse of wings	0.260×0.060		6.62×1.54
Size of body	0.240×0.030	•••	6.09×0.76

Head greyish-brown; rostrum about the length of thorax, testaceous; palpi testaceous; antennæ dark brown. Thorax

fulvous or brownish-fulvous, levigate, without stripes; pectus and metathorax somewhat lighter. Halteres pale ochreous-yellow. Abdomen including genitalia brownish-fulvous, slightly infuscated. Legs light testaceous or brownish-ochreous, the femora pale at the tips preceded by a ring of brownish. Wings hyaline or almost so, slightly yellowish between first longitudinal vein and costa; veins testaceous-brown; stigma rather long, not very distinct, greyish. Auxiliary vein reaching costa at a point almost opposite inner end of sub-marginal cell; sub-costal cross-vein at its tip, appearing between it and first longitudinal vein; præfurca slightly arcuated at base; small cross-vein equal in length to inner end of second posterior cell; great cross-vein a little beyond inner end of discal cell.

Hab.—Narrabeen Lagoon, near Manly, N.S.W. (Skuse). One specimen in January.

314. Rhamphidia venusta, sp.n.

♂.—Length of antennæ	0.045 inch		1·13 millimètres.
Expanse of wings	0.290×0.060	•••	7.35×1.54
Size of body	0.250×0.035		6.34×0.88

Q.—Length of antennæ 0.045 inch ... 1.13 millimètres. Expanse of wings 0.290×0.060 ... 7.35×1.54 Size of body..... 0.210×0.035 ... 5.33×0.88

Head, including rostrum, palpi, and antennæ deep brown or blackish; the rostrum about twice the length of head. Thorax pruinose with pinkish-and yellowish-grey, with four deep brown velvety stripes, the intermediate pair beginning below the anterior margin and stopping before the transverse suture, the lateral ones broader, beginning below the humeri, reaching the scutellum and jutting triangularly opposite the origin of the wings; collare deep brown; mesonotum bordered by a deep brown broad line, usually sending back three small tooth-like offshoots, one at each humerus and a middle one (which sometimes meets the anterior extremity of the median longitudinal stripes); pleuræ with a

dark brown stripe; pectus and metanotum usually dark brown. Halteres pale yellow. Abdomen dark fuscous-brown; Q ovipositor ochraceous. Coxe and femora yellowish-brown, sometimes darker: base of coxe, the trochanters, and a broad ring at tip of femora, dark brown; tibiæ and tarsi greyish-brownish, more or less infuscated. Wings somewhat tinged; all the veins slightly clouded with greyish; a more or less distinct cloud at base of præfurca, sometimes another connecting stigma with discal cell, and less frequently a third at inner end of discal cell; stigma dark fuscous; veins cinereous, the costal and first longitudinal veins yellowish. Auxiliary veins reaching costa at a point a little before inner end of sub-marginal cell; sub-costal cross-vein at its tip, connecting it with first longitudinal vein; præfurca angularly bent near its origin, sometimes with a small tooth of a vein at the angle; small cross-vein shorter than inner end of second posterior cell; inner end of discal cell considerably larger than outer end, opposite tip of sixth longitudinal vein, and forming an angle much less than a right angle; great cross-vein situated a little beyond inner end of discal cell.

Hab.—Knapsack Gully, Blue Mountains; Clifton; and Middle Harbour, near Sydney (Skuse). Four specimens.

Obs.—In one specimen (in one wing only) a supernumerary cross-vein exists in the first basal cell, joining the second longitudinal vein near its origin.

315. RHAMPHIDIA NIVEITARSIS, sp.n.

Q.—Length of antennæ	0.047 inch	 1·18 millimètres.
Expanse of wings,	0.270×0.057	 6.85×1.44
Size of body	0.270×0.003	 6.85×0.76

Head greyish-brown; rostrum a little longer than the head, basal portion ochreous, the tip brown; palpi brown; antennæ brown, the first joint of scapus usually ochreous. Collare tinged with brown. Thorax ochreous-brown (darker on mesonotum), somewhat shining; pleuræ ochreous, more or less hoary. Halteres infuscated, the

base of stem pale ochreous. Abdomen brown; venter more or less ochreous; ovipositor rather long, slightly curved, brown. Coxe ochreous; trochanters very slightly tinged with blackish at tip; femora brown, white at tip; tibiæ brown with a slight ring at base, and a third of their length at distal end, white; tarsi entirely Wings hyaline, with brilliant purplish and golden reflections; veins brown; stigma pale, slightly tinted with brownish. Auxiliary vein reaching costa opposite or somewhat beyond inner end of first posterior cell; sub-costal cross-vein near its tip, connecting it with the first longitudinal vein; præfurca short, slightly arcuated at its base; petiole of sub-marginal cell rather more than half the length of præfurca; small cross-vein nearly as long as the great cross-vein; third posterior cell more than three times broader at the tip than at its inner end, principally owing to the divergence of the posterior branch of the fourth vein; great cross-vein situated about middle of discal cell, the latter slightly angulated at that point.

Hab.—Knapsack Gully, Blue Mountains, and Woronora, N.S.W. (Masters and Skuse). Six specimens.

Genus 8. ORIMARGA, O.-Sacken.

Limnobia, Zetterstedt, Dipt. Scand. X. p. 389, 1851; Orimarga, O.-Sack., Mon. Dipt. N. Amer. IV. p. 120, tab. I. f. 9, 1869; Ninguis, Wallengren, Entom. Tidskr. Stockh. 1881 (on authority of Mik); Orimarga, O.-Sack., Studies II. p. 186, 1887.

"One sub-marginal cell; four posterior cells; discal cell open, coalescent with the second posterior cell; great cross-vein about the middle of the wing, and hence, the fourth posterior cell very long. Tibiæ without spurs at the tip; empodia distinct. Antennæ 16-jointed. Basal pieces of the male forceps elongated, slender, with horny, slender, claw-shaped appendages at the tip; upper valves of the ovipositor small, slender, pointed." (Osten-Sacken).

The following described are, as far as I can ascertain, the first species of this genus discovered out of Europe. Altogether only a few examples seem to be known.

316. Orimarga australis, sp.n. (Pl. XXI., fig. 10).

3.—Length of ante	nnæ 0 ·	042 inch	• • •	1.06 millimètres.
Expanse of win	ngs 0:5	250×0.042		6.34×1.06
Size of body	0:	210×0.020		5.33×0.50
Q.—Length of ante	nnæ 0·0	042 inch		1.06 millimètres.
Expanse of wir	ngs 0·	270×0.045		6.85×1.13

Size of body...... 0.210×0.020 ... 5.33×0.50

Head, rostrum, palpi and antennæ light reddish-brown; head hoary in a certain light; rostrum rather longer than the head. Thorax brownish-ochreous, hoary. Halteres pale. Abdomen brownish-ochreous to light reddish-brown; genitalia ferruginous. Legs uniformly pale yellowish-grey, apparently glabrous. Wings narrow, microscopically granulose, with a somewhat whitish appearance, non-iridescent; veins, like the membrane, colourless; stigma not visible. Auxiliary vein reaching costa opposite 2/3 the length of præfurca; sub-costal cross-vein a little before tip of auxiliary vein; first longitudinal vein reaching costa at a point opposite tip of posterior branch of fourth longitudinal, and at 3 the distance from tip of auxiliary vein to apex of wing; second longitudinal originating at about middle of the length of wing, angularly bent near its origin, then running almost straight; præfurca 2 the length of sub-marginal cell; marginal cross-vein opposite small cross-vein, and at a point ½ the distance from inner end of sub-marginal cell to tip of first longitudinal vein; veins inclosing first posterior cell almost parallel, slightly convergent towards their tips; inner end of second posterior cell a little before small cross-vein; great cross-vein a little oblique, situated at a point mid-way between origin of second longitudinal vein and inner end of submarginal cell; sixth longitudinal vein converging towards fifth longitudinal vein at the tip.

Hab.—Middle Harbour, near Sydney (Skuse). Three specimens.

Obs.—The alar venation of this species chiefly differs from that of O. alpina, Zett., figured by Baron O.-Sacken (Mon. Dipt. N.

Amer. IV. pl. 1. f. 9), in having the marginal cross-vein more remote from the tip of first longitudinal vein, and the great cross-vein not quite so near the middle of the wing.

317. ORIMARGA INORNATA, sp.n.

Q.—Length of antennæ 0.040 inch ... 1.01 millimètres. Expanse of wings 0.200×0.040 ... 5.08×1.01 Size of body 0.190×0.020 ... 4.81×0.50

Head, including rostrum, palpi and antennæ, black; head hoary; rostrum about the length of the head. Thorax black, hoary. Halteres pale yellowish, the club somewhat infuscated. Abdomen deep fuscous-brown, somewhat shining; ovipositor ochreous-brown. Legs yellowish-brown; tarsi darker. Wings narrow, microscopically granulose, with a somewhat whitish appearance, weakly iridescent; veins pale; stigma not visible. Auxiliary vein reaching costa opposite a point somewhat before \frac{1}{2} the length of præfurca; sub-costal cross-vein at tip of auxiliary vein; first longitudinal vein reaching costa opposite a point somewhat before tip of posterior branch of fourth longitudinal, and at 2 the distance from tip of auxiliary vein to apex of wing; second longitudinal vein originating at about middle of the length of wing; præfurca moderately arcuated near its origin, nearly 2 the length of submarginal cell; marginal cross-vein in advance of small cross-vein a distance equal to its length, and at a point mid-way between inner end of sub-marginal cell and tip of first longitudinal vein; marginal and small cross-veins equal in length; veins inclosing first posterior cell considerably convergent towards their tips; inner end of second posterior cell a little before small cross-vein; great cross-vein a little oblique, situated about mid-way between origin of second longitudinal vein and inner end of sub-marginal cell; sixth longitudinal vein converging towards fifth longitudinal at the tip.

Hab.—Clifton, Illawarra District (Skuse). One specimen in December.

Obs.—The great cross-vein is situated in very much the same position as in O. australis; the marginal cross-vein as in O. alpina, Zett. In one wing there is a supernumerary cross-vein near the base of the second posterior cell, thus inclosing a small square cell.

Genus 9. Leiponeura, gen. nov.

One sub-marginal cell; four posterior cells; discal cell subtriangular; no marginal cross-vein; tip of auxiliary vein before or beyond the origin of second longitudinal vein; the sub-costal cross-vein at or a little before the tip of the auxiliary vein; third longitudinal vein considerably arcuated, joining margin close to tip of anterior branch of fourth longitudinal. Antennæ 16-jointed, short. Tibiæ without spurs at the tip; empodia distinct; ungues smooth.

Rostrum short, about half the length of the head. Palpi short, the first and last joints of equal length, and about equal to the second and third taken together (Pl. xxiv., fig. 53, palpi of L. brevivena). Antennæ short, if bent back would not reach the root of the wings; joints of the scapus of equal length, sub-cylindrical; joints of the flagellum elongate, with a minute pubescence and beset with short hairs: in L. brevivena the first two or three flagellar joints are sub-globose (Pl. xxiv., fig. 54). Eyes glabrous; front rather narrow. Collare short. The thorax with distinct shining humeral pits; transverse suture distinct. Upper valves of the ovipositor rather long, slender, pointed, curved upwards towards the extremity. Legs moderately long, slender, the femora incrassated at the tip; ungues very small, smooth. Wings rather long and narrow, with a semi-diaphanous appearance, and a weak iridescence; the pubescence on their surface extremely microscopic, as in Antocha.* Anal angle of wings inconspicuous. Veins with a minute pubescence. Stigma long, indistinct. The tip of the auxiliary vein reaches beyond the origin of the second longitudinal vein in L. gracilis, a distance about twice the length of the great

^{*} I could discover only minute dots with a $\frac{1}{4}$ in. objective.

cross-vein, but in *L. brevivena* it joins the costa about a similar distance before the origin; this is on account of the difference in the length and character of the præfurca, which in the first-named species originates at an acute angle about the middle of the length of the wing, but in a rounded angle considerably beyond the middle in *brevivena*. Marginal cross-vein wanting. Second longitudinal vein gently bending upwards to the margin; third longitudinal vein arcuated downwards, reaching the margin close to the tip of the anterior branch of the fourth longitudinal; so that the sub-marginal cell is enormously widened, and the first posterior cell extremely narrowed, at the wing-margin.

The sub-marginal cell is very little longer than the first posterior; the small or anterior cross-vein is arcuated and unusually long, being quite the length of the great cross-vein; consequently the inner end of the discal cell is very short, which causes the cell to be almost triangular; great cross-vein at, or a little before, the inner end of the discal cell; fifth and sixth longitudinal veins nearly straight; the seventh very slightly arcuated.

This genus appears to be somewhat related to Antocha, O.-Sack., on the one hand, and Artarba, O.-Sack., on the other; to the former in wanting the cross-vein, to the latter by the extremely microscopic pubescence of the wings, but in other particulars it seems to entirely differ. Unfortunately, not having a single male specimen, I cannot describe the holding-forceps. Both the following described have their pleuræ conspicuously striped with yellow and brown.

318. Leiponeura gracilis, sp.n. (Pl. XXI., fig. 11).

Q.—Length of antennæ..... 0.047 inch ... 1.18 millimètres. Expanse of wings...... 0.240×0.050 ... 6.09×1.27 Size of body...... 0.210×0.025 ... 5.33×0.62

Head, including rostrum, palpi and antennæ, black, the front with a hoary bloom; sometimes the face and rostrum yellow. Thorax brown, opaque, with two small yellow spots behind the

suture in the middle, and one on each side above the origin of the wings; bordered laterally and in front by a narrow yellow stripe, followed on the pleure by three longitudinal stripes, brown and yellow alternately; scutellum yellow, somewhat tinged with brown anteriorly; metanotum deep brown. Halteres yellow. Abdomen brown, sometimes deep brown; venter and ovipositor usually pale ochreous-yellow. Legs light umber-brown, the terminal tarsal joints blackish. Wings slightly tinged with brownish-grey or very pale brownish; veins light umber-brown; stigma colourless or just perceptibly brownish, elongate, narrow, stretching almost the entire length of the ultimate section of the second longitudinal Auxiliary vein reaching costa considerably beyond origin of second longitudinal, usually a distance equal to about twice the length of great cross-vein; sub-costal cross-vein a little before the tip of auxiliary vein, sometimes even a distance equal to length of great cross-vein; præfurca equal in length to the continuation of the vein, originating at an acute angle; discal cell about half the length of second posterior cell; great cross-vein situated somewhat before its inner end.

Hab.—Knapsack Gully, Blue Mts., and Sydney, N.S.W. (Masters and Skuse.) Five specimens in September.

319. Leiponeura brevivena, sp.n.

Q.—Length of antennæ	0.037 inch		0.90 millimètre.
Expanse of wings	0.180×0.045	•••	4.56×1.13
Size of body	0.150×0.020		3.81×0.50

Head, including rostrum, palpi and antennæ dark brown or black, the joints of the scapus ochraceous or light ferruginous. Thorax similarly coloured to that of *L. gracilis*; the first lateral yellow stripe, however, is much broader in this species, and the following brown one a mere line; and the yellow spots in front of the scutellum are indistinct. Halteres pale. Abdomen brown, each segment very slightly bordered posteriorly with

yellow; venter and ovipositor ochraceous-yellow. Legs pale brownish-ochreous. Wings with a delicate brownish tint, the stigma and extremity of first sub-marginal cell tinted somewhat darker; veins light brown; stigma not twice the length of great cross-vein. Auxiliary vein reaching costa before origin of second longitudinal vein a distance equal to the length of great cross-vein; sub-costal vein at tip of auxiliary vein; præfurca much arcuated near its base, originating considerably beyond the middle of the wing, shorter than the rest of the vein; discal cell nearly as long as the second posterior cell, its inner end almost an angle; great cross-vein situated a little before the inner end.

Hab.—Berowra, N.S.W. (Skuse). Two specimens in August.

Genus 10. TEUCHOLABIS, Osten-Sacken.

Teucholabis, O.-Sack., Proc. Ac. Nat. Soc. Philad. p. 223, 1859; Mon. Dipt. N. Amer. IV. p. 129, pl. 1. fig. 12 (wing), pl. 111. fig. 9 (genitalia), 1869; Studies, II. 188, 1887.

"One sub-marginal cell; four posterior cells; a discal cell; first longitudinal vein very short, its tip being but little beyond the middle of the length of the wing, nearly opposite or not much beyond the inner end of the sub-marginal cell. Wings very hyaline, stigma rounded. Antennæ 16-jointed. Rostrum cylindrical, distinctly prolonged, although shorter than the head. Collare prolonged in a narrow linear neck. Feet rather stout, hairy; tibiæ without spurs at the tip; empodia distinct, but small. Genitals of the male hairy on the outside; forceps with large, horny appendages and an anal style." (Osten-Sacken).

This genus also occurs in North and South America, Southern Asia and New Guinea; only a small number of species are known.

320. Teucholabis meridiana, sp.n.

♂.—Length of antenn	0.055 inch	•••	1.39 millimètres.
Expanse of wings	0.240×0.090		6.09×2.27
Size of body	0.230 \ 0.035		5.84 × 0.88

Head dark brown, hoary on the front. Rostrum about the length of the head, ochraceous; palpi and antennæ dark brown, the basal joints of the latter tinged with ochraceous, the flagellar joints gradually diminishing in size, large and globose at the base, becoming slender and oblong towards the tip. Thorax brownishochraceous, shining, with three deep brown or black stripes; intermediate one beginning at collare; lateral ones much broadened anteriorly, completely interrupted at transverse suture, with a vellow spot at their posteriorly extremity above the origin of the wings; scutellum yellow; metanotum deep brown, bordered with yellow at the sides; pleuræ ochraceous-yellow, with a dark brown stripe from humeri to pectus. Halteres yellow. Abdomen brown, anterior half of the segments brownish-ochraceous; forceps brown. Coxe and femora ochraceous, the latter brown at the tip; tibiæ and tarsi brown. Wings almost hyaline, the cross-veins and apical margin of wing slightly infuscated with brownish, and the costal and sub-costal cells tinted with yellowish; costal, auxiliary and first longitudinal veins ochraceous, the rest brown; stigma rather small, brown. The venation exactly like that of T. complexa, O.-Sack., (Mon. Dipt. N. Amer. IV. pl. I. fig. 12), except that the sub-costal cell is a little expanded near the stigma, the third longitudinal vein and anterior branch of the fourth longitudinal run almost straight to the margin, the sixth longitudinal vein is a little sinuated at the tip, and that of the seventh considerably arcuated. Great cross-vein situated beyond small cross-vein, and about opposite tip of first longitudinal vein.

Hab.—Victoria. Type-specimen in Coll. Australian Museum. Obs.—Very closely related to Teucholabis complexa, O.-Sack., from North America.

Section III. ERIOPTERINA.

"Two sub-marginal cells; four (very seldom five) posterior cells; discal cell sometimes closed, but very often open. Normal number of the antennal joints sixteen. Eyes glabrous. Tibiæ without spurs at the tip; empodia distinct; ungues smooth on the under side." (Osten-Sacken.)

Rather more than a dozen genera, chiefly American and European, are referred to this section; a few of them doubtfully. Some of them, as remarked by Baron Osten-Sacken, seem to exhibit the aspect of the Limnophilina. *Conosia* is one of these puzzling genera. Outside of America and Europe very little has been done amongst the Eriopterina. Dr. E. Bergroth has recently described about half a dozen species from South Africa, for one species of which he erects the new genus *Podoneura*; only three species have hitherto been recorded from Australia, two belonging to the genus *Trimicra*, and one to *Gnophomyia*.

Genus 11. Rhypholophus, Kolenati.

Rhypholophus, Kolenati, Wiener Entom. Mon. p. 393, 1863; O.-Sacken, Mon. Dipt. N. Amer. IV. p. 139, pl. 1. figs. 14 and 15, 1869; Studies, II. p. 192, 1887.

"Two sub-marginal cells; four posterior cells; discal cell present or absent. Wings pubescent on the whole surface. The second longitudinal vein originates at a more or less acute angle, before the middle of the anterior margin; the sub-costal cross-vein is a considerable distance (two or three lengths of the great cross-vein) anterior to the tip of the auxiliary vein. Antennæ 16-jointed. Tibiæ without spurs at the tip; ungues smooth on the underside; empodia distinct." (Osten-Sacken.)

Sub-genus, Amphineurus, sub-gen. nov.

No discal cell. Posterior branch of fourth longitudinal vein forked; base of the fork (third posterior cell) situated at or a little before base of second posterior cell; the second and third posterior cells running almost to a point at the base. Second longitudinal vein arcuated or angulated at its origin, sometimes with even a short stump of a vein; the sub-costal cross-vein situated only a short distance beyond this origin.

In the main characters these insects appear to agree with *Rhypholophus*, but the peculiar modification of the second and third posterior cells, constant in both species, is a distinctive

characteristic, evidently of more importance than the mere absence of a discal cell under ordinary circumstances. They also apparently differ from the typical species of *Rhypholophus* in having the second longitudinal vein arcuated or even angulated at the base. It is unfortunate that all the specimens before me are fémales, as an examination of the male forceps would be interesting.

The hind femora are at least one-third longer than the intermediate pair, and distinctly wider than in either this or the fore pair. The third longitudinal vein, beyond the small cross-vein, is perfectly straight, and noticeably thicker than the other veins terminating at the apex of the wing. (Pl. xxi., fig. 12).

321. Rhypholophus (Amphineurus) umbraticus, sp.n.

Q.—Length of antennæ.... 0.050 inch ... 1.27 millimètres. Expanse of wings..... 0.260×0.080 ... 6.62×2.02 Size of body 0.200×0.035 ... 5.08×0.88

Head dark brown, clothed with golden-yellow hairs; palpi, rostrum, and antennæ brown, the first few joints of antennæ and last joint of palpi more or less ochreous. Thorax deep fuscous-brown, opaque, sparingly sprinkled with short hairs; lateral margin from humeri to base of wings tinged with ochreous; scutellum paler fuscous, or even ochreous-brown. Halteres ochreous with fuscous stem, the base more or less ochreous. Abdomen deep brown, clothed with yellow hairs; pectus and ovipositor ochreous-yellow or brownish-ochreous. Legs ochreous-brown to fuscous, terminal tarsal joints infuscated. Coxe usually ochreous or brownish-ochreous. Wings pellucid (when denuded) tinged with brownish-yellow anteriorly and along the fifth longitudinal vein; densely covered with brown hairs, which appear darker (being thicker) at the tips of the auxiliary and first longitudinal veins and about the great cross-vein; veins pale brownish-Auxiliary vein strong and distinct, reaching costa beyond marginal cross-vein a distance equal to the length of latter; sub-costal cross-vein situated a short distance beyond origin of second longitudinal vein; first longitudinal pale at its tip; subcostal cell very slightly expanded at tip of first longitudinal vein; petiole of first sub-marginal cell about twice the length of distance between origin of third longitudinal vein and small cross-vein; præfurca angularly bent near its origin, with a small stump of a vein; base of fork of posterior branch of fourth longitudinal vein situated a little before inner end of second posterior cell; great cross-vein joining fourth longitudinal vein a little before inner end of third posterior cell.

Hab.—Lawson, Blue Mountains, N.S.W.; January (Masters).

322. Rhypholophus (Amphineurus) maculosus, sp.n.

Q.—Length of antennæ..... 0.040 inch ... 1.01 millimètres. Expanse of wings 0.220×0.050 ... 5.58×1.27 Size of body..... 0.180×0.020 ... 4.56×0.50

Greyish-brown. Head somewhat sooty-brown, with short yellow hairs, palpi, rostrum, and antennæ brown; joints of flagellum sub-elliptic, with short hairs. Thorax opaque; pleuræ with two longitudinal narrow stripes of brown, the first from base of fore coxæ to base of halteres, the second above base of intermediate and hind coxe. Halteres slightly yellowish at the base. Abdomen somewhat shining, clothed with short yellow hairs, the segments slightly ochreous laterally; ovipositor ochreous-brown, the upper valves curved. Coxæ and base of femora ochreous or greyishochreous; genua pale. Wings with a greyish tint; clothed with small alternate patches of pale yellow and blackish pubescence, giving the wing a somewhat indistinct spotted appearance; veins ochreous-yellow, the costal, and first, third, and fifth longitudinal veins most distinctly so. Auxiliary veins reaching costa at a point opposite marginal cross-vein; sub-costal cross-vein indistinct, situated a short distance beyond origin of second longitudinal vein; first longitudinal vein pale to its tip; marginal cross-vein at or a little beyond base of first sub-marginal cell; præfurca arcuated at its origin; petiole of first sub-marginal cell very short, as long or

a little longer than distance between origin of third longitudinal vein and small cross-vein; base of third posterior cell situated very slightly before that of second posterior; great cross-veins joining fourth longitudinal vein a short distance before inner end of third posterior cell.

Hab.—Mount Kosciusko, N.S.W., at 5000 ft.; March (Helms).
One specimen in Coll. Australian Museum.

Genus 12. Molophilus, Curtis.

Molophilus, Curtis, Brit. Ent. X. p. 444, 1833; O.-Sacken, Mon. Dipt. N. Amer. IV. p. 153, pl. I. fig. 19, 1869; Studies, II. p. 192, 1887.

"Two submarginal cells; four posterior cells; discal cell open. Wings pubescent along the veins only. Second longitudinal vein usually originates at a very acute angle, some distance before the middle of the anterior margin; subcostal cross-vein is at a considerable distance from the tip of the auxiliary vein; the præfurca ends in the first submarginal cell, which is longer than the second; the inner end of the discal cell (or rather, as it is always open, of the second posterior cell), as well as the great cross-vein, not in one line with the small cross-vein, but much nearer to the root of the wing. Antennæ 16-jointed. Tibiæ without spurs at the tip; ungues smooth on the under side; empodia distinct." (Osten-Sacken.)

I quite agree with Baron Osten-Sacken that this is a distinct genus. To the American, European, and New Zealand species already recorded, I now add fourteen species from Australia. It appears to be one of our best represented genera, both as regards species and individuals. Some species are very numerous.

The venation seems to be very much the same in all the following species, not exhibiting any noticeable specific characters; the hairy clothing of the veins, however, differs in length and density. *Molophilus longicornis* is remarkable in possessing very long antennæ.

The tibiæ of the males in some, if not the majority, of species exhibit a sexual character which does not appear to have been noted, or recorded, by previous authors. This is an annular swelling or nodosity, hardly perceptible in some instances but often prominent and dark-coloured, situated close to the base of the fore tibiæ. It would seem that North American species do not have this, since Baron Osten-Sacken does not allude to it in his monograph and being present it could scarcely have escaped his notice.

323. Molophilus ruficollis, sp.n.

3	-Length of antenna	0.070* inch	• • •	1.77 millimètres.
	Expanse of wings	0.220×0.065		5.58×1.66
	Size of body	0.170×0.035		4.31×0.88
0	Tonoth of antenna	0:070 inch		1.77 millimàtres

Head, including rostrum, palpi, and antenne dark brown; flagellar joints sub-cylindrical, somewhat fusiform, densely and uniformly verticillate-pilose; collare with long golden hairs. Thorax reddish-brown, levigate, with two longitudinal rows of brown hairs; humeri with an ochreous spot; a patch of long yellow hairs behind the origin of wings. Halteres light fulvous-brown with golden pubescence. Abdomen dusky brown, clothed with golden-yellow pubescence; male forceps reddish-brown; ovipositor short, curved, ochreous, or brownish-ochreous. Coxæ reddish-brown. Remaining joints dusky brown; the femora with a yellow ring a little before their tip (broader on the hind pair); hind femora stout. Wings sub-hyaline (when denuded); somewhat clouded in the vicinity of bases of sub-marginal cells; the veins brownish, with dense long hairs, covering the cells; the

^{*} The stated length of the antennæ in this and some of the following small insects is only approximate, owing to their being sometimes very difficult to measure.

hairs dusky brown, with a dull somewhat cupreous reflection; more dense and forming a transverse somewhat indistinct clouding between tip of auxiliary vein and base of first posterior cell, also on great cross-vein and basal portion of posterior branch of fourth longitudinal vein.

· Hab. — Lawson, Blue Mountains, N.S.W. (Masters). Six specimens in January.

324. Molophilus femoratus, sp.n.

Q.—Length of antennæ. ... 0.050 inch ... 1.27 millimètres. Expanse of wings. ... 0.180×0.050 ... 4.56×1.27 Size of body. ... 0.125×0.023 ... 3.16×0.58

Head, including rostrum and palpi, dark brown, densely covered with brown hairs; antennæ more ochreous-brown, with long, dense, brown verticils; flagellar joints almost fusiform. Thorax greyish-brown, levigate; humeri slightly tinged with ochreous; pleuræ and metathorax reddish-brown. Halteres greyish-brown, the base of stem ochreous. Abdomen dark, somewhat reddish-brown, clothed with tolerably long, yellowish hairs; ovipositor short, curved, brownish-ochreous. Coxæ testaceous or brownish-ochreous. Remaining joints dark brown; all the femora with a broad ring of fulvous much (twice its length) before their tips; the hind femora very stout. Wings sub-hyaline (when denuded); veins pale, densely beset with long brownish hairs; the latter rather more dense and forming an indistinct narrow transverse clouding from tip of auxiliary vein to base of first posterior cell.

Hab.—Lawson, Blue Mountains, N.S.W. (Masters). January. Obs.—I have only a single specimen before me.

325. Molophilus Helmsi, sp.n.

Q.—Length of antennæ...... 0 060 inch ... 1.54 millimètres Expanse of wings. 0.270×0.070 ... 6.85×1.77 Size of body...... 0.185×0.040 ... 4.68×1.01

Dusky brown. Head, including rostrum, palpi, and antennæ black or deep brown; joints of the flagellum fusiform, with some long verticillate hairs. Thorax levigate, with two longitudinal rows of golden hairs; humeri tinged with ochreous-yellow. Halteres with a dense pale yellowish sericeous pubescence, the base of stem brown. Abdomen clothed with golden-yellow hairs; male forceps black; ovipositor ochreous, the lower valve brown. Legs entirely dusky or sooty brown. Wings sub-hyaline, the veins yellowish, with dense long hairs covering the cells; the hairs chiefly dusky brown, with some golden patches; an elongate patch of golden hairs on costa immediately beyond the tip of auxiliary vein; that portion of first longitudinal vein before the costal patch, the third longitudinal vein except at its base and towards its extremity, portions of veins in the middle of the wing, and fifth, sixth and seventh longitudinal veins, with golden hairs; marginal cilia dusky brown variegated with golden.

Hab.—Mount Kosciusko, N.S.W., at 5000 ft.; March (Helms). Two specimens in Coll. Australian Museum.

326. Molophilus notatipennis, sp.n.

Q.—Length of antennæ..... 0.050 inch ... 1.27 millimètres Expanse of wings...... 0.220×0.050 ... 5.58×1.27 Size of body...... 0.140×0.025 ... 3.55×0.62

Head, including rostrum, palpi, and antennæ, dark brown; flagellar joints subcylindrical, rather larger towards their base, verticillate-pilose. Thorax reddish-brown, levigate, with two sparse longitudinal rows of brown hairs; humeri, base of wings and centre of transverse suture ochre-yellow. Halteres pale yellow, with a sericeous pubescence. Abdomen dusky or deep umberbrown, clothed with yellow hairs; ovipositor brownish-ochreous,

valves very short. Coxe ochreous. Remaining joints dusky brown, the knees pale yellow or whitish. Wings sub-hyaline (when denuded); the veins pale brownish, with dense long hairs covering the cells; hairs brown, more dense and forming five blackish clouds as follows:—first at the bases of the submarginal cells, second at the basal portion of posterior branch of fourth longitudinal fork, another at the middle of third longitudinal vein, another near base of fourth and fifth longitudinal veins, and the last beyond middle of seventh longitudinal vein.

Hab.—Gosford, N.S.W. (Skuse). One specimen in August. Taken flying about a tree-trunk.

327. Molophilus Froggatti, sp.n.

Q.—Length of antennæ.... 0.090 inch ... 2.27 millimètres. Expanse of wings.... 0.290×0.080 ... 7.35×2.02 Size of body.... 0.320×0.045 ... 8.12×1.13

Head brown, pruinose with greyish; front with short black hairs; occiput with long golden-yellow hairs, rostrum, palpi, and antennæ black, the two basal joints of the latter brown; flagellar joints sub-cylindrical. Thorax light greyish-brown, dull, with three darker though indistinct brown stripes; intermediate stripe double; humeral pits and suture deep shining brown; pleuræ with a hoary bloom. Halteres pale ochreous-yellow. Abdomen brown, somewhat greyish, tolerably shining, clothed with brown hairs; venter ochreous-yellow; ovipositor rather long, curved, ferruginous. Legs obscure testaceous, densely clothed with hairs which exhibit a yellow reflection when viewed at a certain obliquity; tibiæ black at tip; apical half of first and whole of remaining joints of tarsi black. Wings with a light greyishbrown tint; veins yellowish-brown, densely and uniformly beset with long brown hairs. Second sub-marginal cell longer than the first posterior; inner end of third posterior cell opposite that of first sub-marginal cell; great cross-vein long and very oblique,

52

joining close to base of posterior branch of fourth longitudinal vein.

Hab.—Waverley, near Sydney; in October (Froggatt).

Obs.—I have seen only one specimen of this very distinct and comparatively large example of the genus.

328. Molophilus montivagus, sp.n.

Q.—Length of antennæ	0.045 inch	 1·13 millimètres
Expanse of wings	0.220×0.065	 5.58×1.66
Size of body	0.180×0.035	 4.56×0.88

Head greyish-brown, with a minute yellowish pubescence; rostrum, palpi and antennæ black or dark brown; flagellar joints elliptical, with short verticils. Collare ochreous. Thorax light ochreous-brown, almost covered by a very broad brownish median stripe; the whole pruinose with greyish; humeri slightly ochreous yellow; pleuræ dusky brown. Halteres very pale yellow, with a sericeous pubescence. Abdomen dusky brown, opaque, clothed with yellow hairs, the segments with an indistinct narrow border of dull ochreous-brown posteriorly; ovipositor testaceous. Coxæ dull testaceous. Remainder of joints uniformly dusky brown. Wings sub-hyaline; veins ochreous-yellow, sparingly beset with short grey hairs, imparting to the wings a light greyish appearance.

Hab.—Jindabyne, N.S.W., 3000 ft., March (Helms). One specimen in Coll. Australian Museum.

329. Molophilus gracilis, sp.n.

♂.—Length of antennæ	0.070 inch .		1.77 millimètres.
Expanse of wings	0.220×0.055 .		5.58×1.39
Size of body	0.160×0.030 .		4.06×0.76
Q.—Length of antennæ	0.055 inch .		1·39 millimètres.
Expanse of wings	0.220×0.055 .	•••	5.58×1.39

Size of body...... 0.180×0.030 ... 4.56×0.76

Head greyish or greyish-ochreous, the anterior portion of the front sometimes yellow; rostrum and palpi black or deep brown; antennæ brown, the basal joints ochreous; flagellar joints fusiform, with grevish verticils, longer in male. Collare yellow. Thorax greyishochreous or light greyish-brown, with a greyish bloom, sometimes with indistinct trace of a double median longitudinal stripe; humeri and a narrow lateral line to origin of wings yellow; metathorax and pleuræ brown to dark brown; scutellum ochreous, brownish or testaceous. Halteres yellow, sericeous. Abdomen brown or dusky brown, clothed with yellow hairs; forceps testaceous-brown, the horny appendages black; ovipositor long and straight, ochreous or testaceous. Legs testaceous or light ochreous-brown, with a greyish reflection; tibiæ and tarsi more or less distinctly infuscated; the tibiæ of the fore legs in the male with a black slightly swollen ring just beyond base. Wings sub-hyaline; veins yellowish or brownish, with long brownish hairs which impart a grevish appearance to the wings; a small indistinct clouding at the great cross-vein and base of posterior branch of fourth longitudinal fork, also a second smaller one often observable at marginal crossvein.

Hab.—Apparently generally distributed in N.S.W. (Masters and Skuse). Almost throughout the year.

330. Molophilus annulipes, sp.n.

0.055 :-- -1

6.—Length of antennæ	0.055 inch	• • •	1.39 millimètres.
Expanse of wings	0.180×0.050		4.56×1.27
Size of body	0.150×0.025	•••	3.81×0.62
Ç.—Length of antennæ	0.055 inch		1·39 millimètres.
Expanse of wings	0.190×0.050		4.81×1.27
Size of body	0.150×0.025		3.81×0.62

Fulvous-yellow or more ochreous. Rostrum and palpi dark brown; antennæ brownish; basal joints usually ochreous; flagellar joints fusiform. Thorax somewhat hoary laterally in a certain light, traversed by two sparse longitudinal rows of brown hairs; an ill-defined brownish stripe in the pleuræ from neck to base of wings (not visible in some specimens); pleuræ, metathorax and abdomen light reddish-brown in some specimens; horny appendages of male forceps black; ovipositor of female concolorous with rest of body. Halteres yellow. Legs yellow, sericeous. Femora with two brownish or black rings (generally darker in the male) on apical half; the tibiæ of the fore legs in the male with a black slightly swollen ring just beyond the base; tips of tibiæ and of tarsal joints a little infuscated. Wings pellucid, with a yellow tint; veins yellow with long yellow hairs; a peculiar, very small, cuneate black marking between the auxiliary and first longitudinal veins immediately beyond the humeral cross-vein.

Hab.—Sydney, Blue Mountains, and Hogan's Brush near Gosford, N.S.W.; August to January (Masters and Skuse).

Obs.—Thirteen specimens for comparison.

331. Molophilus flavonotatus, sp.n.

♂.—Length of antennæ	0.070 inch	 1.77 millimètres.
Expanse of wings	0.180×0.047	 4.56×1.18
Size of body	0.120×0.025	 3.04×0.62

Head brown, tinged with yellow, with white pubescence; rostrum and palpi black; antennæ greyish, the basal joints ochreous; flagellar joints fusiform, with white verticils. Collare sulphur-yellow, somewhat tinged with brownish. Thorax rich brown, the humeral region and lateral borders sulphur-yellow; a spot on each side above the origin of wings, the scutellum, lateral borders of metanotum and origin of wings brownish-testaceous or ochreous. Halteres pale with sericeous white pubescence. Abdomen somewhat ochreous-brown, clothed with white hairs; forceps brownish-testaceous, the tips of the horny appendages black. Coxæ brownish-testaceous or ochreous. Remaining joints greyish, their tips a little infuscated; tibiæ of the fore legs with a slightly

swollen scarcely infuscated ring near the base. Wings almost byaline; veins and hairs pale, the latter not dense but tolerably long; a small and rather indistinct linear brown marking between the auxiliary and first longitudinal veins, immediately beyond the humeral cross-vein.

Hab.—Sydney, September (Skuse).

332. Molophilus translucens, sp.n.

♂.—Length of antennæ	0.050 inch	 1.27 millimètres.
Expanse of wings	0.150×0.047	 3·81 × 1·18
Size of body	0.115×0.020	 2.92×0.50

Entirely pale yellow or ochreous; the rostrum, palpi and two basal joints of antennæ sometimes brown or brownish; flagellar joints fusiform, with pale verticils. Body and legs distinctly haired in \mathcal{F} ; horny appendages of male forceps black; ovipositor rather short, curved, concolorous with rest of body. Wings hyaline or nearly so, with delicate opaline iridescence; veins pale, beset with long, very pale yellow, hairs.

Hab.—Lawson, Blue Mts. (Masters); Gosford and Hogan's Brush, Narrara Creek, N.S.W.; August to January (Skuse).

333. Molophilus canus, sp.n.

3	-Length of antennæ	0.050 inch	 1.27 millimètres.
	Expanse of wings	0.190×0.042	 4.81×1.06
	Size of body	0.150×0.025	 3.81×0.62

Head light brown, hoary, with white hairs; rostrum and palpi dark brown, antennæ brown, the basal joints more or less ochreous; flagellar joints fusiform, with white verticils. Thorax light greyish-brown, dull, with a very small transverse brown spot on each side

behind the humeri; pleuræ somewhat hoary; a small tuft of white hairs behind the origin of the wings; origin of wings ochreousyellow. Halteres yellow. Abdomen brown, clothed with white hairs; forceps brownish-ochreous, the tips of horny appendages black. Coxæ ochreous. Remaining joints greyish, with a brownish tinge, somewhat sericeous, slightly infuscated towards their tips; tibiæ of the fore legs with an indistinct slightly swollen infuscated ring near their base. Wings almost hyaline; veins pale yellowish, rather sparingly beset with long pale hairs, imparting a pale greyish appearance to the wings.

Hab.—Sydney (Skuse). August and September.

334. Molophilus pulchripes, sp.n.

 \mathcal{J} .—Length of antennæ.....0.060 inch... 1.54 millimètres.Expanse of wings...... 0.160×0.050 ... 4.06×1.27 Size of body...... 0.130×0.020 ... 3.30×0.50

Head brown, bordered above the eyes with yellow; rostrum, palpi and antennæ brown; basal joints of antennæ yellowish; flagellar joints fusiform; collare yellow or yellowish. Thorax brown, dull, with two longitudinal rows of short brown hairs; humeri, lateral line to origin of wings, transverse suture, a small spot above the origin of wings, scutellum, and lateral borders of metanotum yellow or yellowish. Halteres yellow. Abdomen brown, clothed with yellow hairs; forceps brown, rather lighter than abdominal segments, the horny appendages black. Legs vellowish-brown; femora tipped with brown preceded by a broader ring of golden-yellow; genua yellow; tibiæ and joints of tarsi slightly infuscated at the tips; tibiæ of fore legs with a slightly swollen brown ring near the base. Wings almost hyaline; veins pale-yellowish, moderately clothed with brownish hair, imparting a greyish appearance to the wings; the hairs more dense, longer and perhaps darker, forming an oblique clouding, from tip of auxiliary vein to great cross-vein.

Hab.—Sydney (Skuse). September.

335. Molophilus pervagatus, sp.n.

0.050 :-- -1

3.—Length of antennæ	0.090 men	• • •	1.27 millimetres.
Expanse of wings	0.150×0.042		3.81×1.06
Size of body	0·120 × 0·020		3.04×0.50
Q.—Length of antennæ	0.042 inch		1.06 millimètres.
Expanse of wings	0.150×0.042		3.81×1.06
Size of body	0.135×0.020		3.42×0.50

Head brown, sometimes bordered with yellow or yellowish; rostrum and palpi brown; antennæ brown; the first basal joint vellow; flagellar joints fusiform or sub-cylindrical. Collare yellowish. Thorax light brown, with an ochreous or sometimes a reddish tendency, dull, with two longitudinal rows of brown hairs; humeri and lateral line to origin of wings ochreous-vellow; pleuræ and metathorax dark brown; origin of wings yellowish. Halteres yellow. Abdomen dark brown, clothed with yellow hairs; male forceps and female ovipositor testaceous-brown. Legs ochreous, brownish-yellow or sometimes yellowish-grey, with a sericeous, almost golden-yellow reflection; femora with a brown ring at the tip; fore tibiæ of male with slightly swollen brown ring near the base. Wings hyaline or almost so; veins pale vellowish, clothed with long brownish hairs, imparting a grey appearance to the wings; the hairs, more dense, longer, rather darker, and forming a more or less distinct oblique clouding between the tip of auxiliary vein and great cross-vein, as in M. pulchripes.

Hab.—Generally distributed in N.S.W. (Masters and Skuse). Almost throughout the year.

Obs.—This is probably the most common of our species.

336. Molophilus lucidipennis, sp.n.

♂.—Length of antennæ	0.033 inch	0.84 millimètre
Expanse of wings	0.150×0.042	3.81×1.06
Size of body	0.120×0.020	3.04×0.50

Q.—Length of antennæ..... 0.042 inch ... 1.06 millimètres. Expanse of wings...... 0.150×0.042 ... 3.81×1.06 Size of body...... 0.135×0.020 ... 3.42×0.50

Brown. Thorax dull, with two longitudinal rows of brownish hairs. Halteres testaceous or brownish-ochreous. Abdomen clothed with golden-yellow hairs; anal forceps and female ovipositor testaceous or dull ochreous-brown. Legs light brown, testaceous or brownish-ochreous; tarsi somewhat infuscated with greyish; the tibiæ of fore legs in male with an indistinctly swollen brownish ring near their base. Wings hyaline; veins very pale yellowish, beset with long brownish-yellow hairs, imparting a uniform light greyish appearance to the wings.

Hab.—Lawson, Blue Mountains, N.S.W. (Masters). January.

337. Molophilus longicornis, sp.n.

J.—Length of antennæ	0·120 inch		3·04 millimètres.
Expanse of wings	0.170×0.040	•••	$4 \cdot 31 \times 1 \cdot 01$
Size of body	0·115 × 0·020		2.92×0.50
Q.—Length of antennæ	0.065 inch		1.66 millimètres.
Expanse of wings	0.170×0.040		4.31×1.01
Size of body	0.130×0.020		3.30×0.50

Head, brownish, more or less tinged with yellow; rostrum and palpi brown; antennæ brown (the basal joints in male yellow), in the male the length of body, in female about half the length; flagellar joints cylindrical, with short pedicels; with long verticils in male. Thorax light, somewhat reddish-brown, levigate, with a more or less distinct median ochreous-yellow stripe extending from collare to posterior border of metanotum; the anterior portion of stripe, and also that traversing the metanotum, narrow, the rest as broad as scutellum; sternum and coxæ ochreous-yellow. Halteres brown, the extreme base of stem yellowish. Abdomen brown, clothed with yellow or brownish hairs; genitalia brownish-ochreous

or testaceous. Legs ochreous-yellow; the terminal joints of tarsi almost imperceptibly infuscated. Wings almost hyaline (when denuded); veins brownish, densely beset with long brown hairs.

Hab.—Berowra, N.S.W. (Masters); Knapsack Gully, Blue Mountains, N.S.W. (Skuse). August.

Obs.—One specimen only was captured in each locality. The specimens appear undoubtedly the two sexes of the same species.

Genus 13. Tasiocera, gen.nov.

Two sub-marginal cells; four posterior cells; discal cell present or absent. Wings very cuneiformly narrowed towards the base, pubescent along the veins only. Second longitudinal vein originates at an acute angle some distance before the middle of the anterior margin; sub-costal cross-vein very indistinct or none; præfurca ends in the second sub-marginal cell, which is longer than the first; inner end of discal cell, and great cross-vein, not in one line with the small cross-vein but much nearer to root of the wing (as in Molophilus). Seventh longitudinal vein very short. Antennæ 16-jointed, about twice the length of the entire body. Tibiæ without spurs at the tip; ungues smooth on the under side; empodia distinct. Male forceps very hairy at the apex of the fleshy lobe, terminated with horny appendages, toothed at the extremity (Pl. xxiv., fig. 55).

The rostrum and palpi short. The antennæ with one or more very long cylindrical joints at the base of flagellum, the remainder becoming more flasked-shaped, the terminal joint very small, more or less ovate; adorned with long verticillate hairs. The two joints of the scapus are small, globose, or more cupuliform, equal in size. In *T. gracilicornis* (Pl. xxiv., fig. 56) the flagellar joints more quickly begin to appear flask-shaped, only the first joint being cylindrical; on this account the antennæ are shorter than those of *T. tenuicornis*. The first cylindrical joints and the basal portions of all the following joints are about equal in width; if anything, the flask-shaped joints are slightly broader at their widest part

than the thickness of the cylindrical ones. The verticils are not stiff, but appear slightly crimpled. Legs long and very slender (in *T. gracilicornis* two and a-half times the length of the wings); the intermediate pair very little shorter than the other pairs.

Wings narrow, very cuneiformly so towards their base, fringed with long cilia on the posterior border; the hairs on the veins long enough to reach from vein to vein, causing the wings to appear very hairy. Auxiliary vein very short in T. tenuicornis, extending only to opposite the middle of the prefurca; while in T. gracilicornis it reaches beyond the marginal cross-vein; in both cases it seems to eventually amalgamate with and form a thickening of the costa. The sub-costal cross-vein seems entirely wanting; I could not detect it in wings denuded of hair and mounted in balsam. The discal cell when open coalesces with the third posterior cell, that is, the anterior branch of the fourth longitudinal vein is forked. The first bifurcation of the fourth longitudinal vein begins considerably before the small cross-vein, as in Molophilus. Second sub-marginal and first posterior cells about equal in length, their bases situated about as much before the inner end of first sub-marginal as that of the discal (or third posterior) cell is before theirs. The seventh longitudinal vein is straight and short, and runs close to the margin; in T. tenuicornis it so short that it ceases opposite the origin of the fourth longitudinal vein.

This genus seems intermediate between *Molophilus* and *Erioptera*, but differs from both especially by the antennæ. I have not seen any female examples, which may possible possess short antennæ.

338. Tasiocera tenuicornis, sp.n. (Pl. xxi., fig. 13).

J.—Length of antennæ	0.210 inch	 5·33 millimètres.
Expanse of wings	0.140×0.033	 3.55×0.84
Size of body	0.110×0.016	 2.79×0.40

Head, including palpi, rostrum and antennæ brown; palpi and joints of scapus sometimes pale brown, or greyish-ochreous; first four flagellar joints cylindrical, the first very long and twice the length of the fourth; fifth to ninth joints rather rapidly diminishing in length and becoming more flask-shaped, terminal joint very small, shortly-ovate; all flagellar joints with long, fine, verticillate hairs, which in the flask-shaped joints are confined to their broad basal portion. Thorax brown, almost opaque; pleuræ, scutellum and metanotum sometimes lighter brown or greyish-testaceous. Halteres light brownish-grey. Abdomen brown, clothed with brown hairs; genitalia testaceous, densely haired. Legs sootybrown, with a greyish-brown reflection in a certain light, the coxæ and base of femora greyish-testaceous or pale brown. Wings hyaline, the hairs along the veins long, brown; veins pale; cilia along the posterior margin very long. Auxiliary vein short, terminating in costa opposite middle of præfurca; marginal crossvein pale, situated near base of first sub-marginal cell; base of latter situated beyond that of second sub-marginal a distance rather greater than length of great cross-vein; anterior branch of fourth longitudinal vein originating before inner end of first posterior cell a distance equal to once and a-half to twice the length of great cross vein; discal cell present (it is apparently the posterior branch which is forked, about the middle of its length); great cross-vein before, at, or beyond inner end of discal cell; sixth longitudinal vein a little arcuated at tip; seventh longitudinal vein very short, reaching posterior margin opposite origin of fourth longitudinal vein.

 ${\it Hab}.$ —Sydney and Woronora, N.S.W. (Masters and Skuse). Six specimens.

339. Tasiocera gracilicornis, sp.n.

♂.—Length of antennæ	0·165 inch	• • •	4·18 millimètres.
Expanse of wings	0.150×0.035		3.81 × 0.88
Size of body	0·100 × 0·016		2.54×0.40

Head, including palpi, rostrum and antennæ, brown, the basal joints of latter, also palpi and rostrum, sometimes more ochreous; first flagellar joint cylindrical, slightly narrowed at the apex, very

long, nearly three times the length of the second joint; following joints rapidly diminishing in length and becoming more perfectly flask-shaped, the terminal joints very small, ovate; all the flagellar joints with long fine verticillate hairs except on their narrowed anterior portion (Pl. XXIV., fig. 56). Thorax brown, very slightly shining; pleuræ and pectus sometimes paler. Halteres light brownish-grey, the base of stem ochreous. Abdomen dusky brown, clothed with brown hairs; genitalia testaceous-brown or darker, densely haired. Legs longer than in P. tenuicornis, sooty brown, greyish-brown when viewed in a certain light; the coxæ and extreme base of femora pale brown. Wings hyaline, the hairs along the veins long and brown; veins pale; cilia along the posterior margin very long. Auxiliary vein reaching the costa a short distance beyond marginal cross-vein; the latter near base of first sub-marginal cell; base of first sub-marginal cell obtuse, situated beyond that of the second sub-marginal a distance almost equal to length of great cross-vein; anterior branch of fourth longitudinal vein originating before the inner end of first posterior cell a distance equal to about twice the length of great cross-vein, forked considerably before its middle; discal cell usually open,* coalescent with the third posterior cell; great cross-vein opposite or a little beyond base of third posterior cell; sixth longitudinal vein arcuated at the tip; seventh straight, terminating in posterior margin opposite origin of præfurca.

Hab.—Sydney and Berowra, N.S.W. Five specimens (Masters and Skuse).

Obs.—Readily distinguished from the last by the character of the antennal joints.

Genus 14. ERIOPTERA, Meigen,

Erioptera, Meig., Ill. Mag. II. p. 262, 1803; Syst. Beschr. I. p. 108, 1818; Macquart, S. à B. I. p. 109, 1834; Zetterstedt, F. Lapp. 1840; Dipt. Scand. X., 1851; Walker, Ins. Brit. III.,

^{*} I have found it closed in only one specimen.

p. 273, 1856; Schiner, F. A. Dipt. II., 1864; O. Sacken, Proc. Acad. Nat. Sc. Philad.
p. 225, 1859; Mon. Dipt. N. Amer. IV.
p. 146, 1869; Studies, II.
p. 193, 1887.

"Two sub-marginal cells; four posterior cells; discal cell present or absent. Wings pubescent along the veins only. The second longitudinal vein usually originates at a very acute angle, some distance before the middle of the anterior margin; the sub-costal cross-vein is at a considerable distance (two or three lengths of the great cross-vein, or more) from the tip of the auxiliary vein; the prefurca ends in the second sub-marginal cell, which is longer than the first. Antennæ 16-jointed. Tibiæ without spurs at the tip; ungues smooth on the underside; empodia distinct." (Osten-Sacken).

Sub-genus Erioptera, O.-Sacken.

A. The "prefurca ends in the second sub-marginal cell, which is longer than the first; the inner end of the discal cell (or, when it is open, of the cell with which it coalesces) is on the same line with the small cross-vein.

- 1. The posterior branch of the fourth longitudinal vein is forked (in other words, when the discal cell is open, it coalesces with the second posterior cell; when it is closed, the inner end of the third posterior cell is nearer the basis of the wing than the inner end of the second).
 - a. The seventh longitudinal vein is arcuated (converging towards the sixth) in such a manner, that the auxiliary cell is broader in the middle than near the margin of the wing." (Osten-Sacken).

340. ERIOPTERA OCHRACEA, sp.n.

 \mathcal{S} .—Length of antennæ... 0.030 inch... 0.76 millimètres.Expanse of wings...... 0.170×0.042 ... 4.31×1.06 Size of body 0.135×0.020 ... 3.42×0.50

Q.—Length of antennæ..... 0.037 inch ... 0.90 millimètres. Expanse of wings 0.170×0.042 ... 4.31×1.06 Size of body...... 0.145×0.020 ... 3.66×0.50

Dull brownish ochre-yellow. Palpi and antennæ sometimes brownish. Thorax opaque, sometimes with a very indistinct narrow median brownish stripe; two lateral longitudinal rows of short brown hairs. Halteres with a somewhat infuscated club. Abdomen dull, clothed with yellow hairs; superior segments more or less tinged with brown, with a narrow pale border posteriorly. Terminal joints of tarsi somewhat infuscated. Wings hyaline, microscopically granulose; veins ochreous-brown, the pubescence very short. Auxiliary veins reaching costa at a point a little before marginal cross-vein; discal cell open.

Hab.—Generally distributed in N.S.W. (Masters and Skuse). Almost throughout the year.

Obs.—The above-described answers in every particular to the characters of the sub-genus *Erioptera* as defined by Baron Osten-Sacken. It is the only Australian example as yet known to me.

Genus 15. Trimicra, O.-Sacken.

Trimicra, O.-Sacken, Proc. Ac. Nat. Sc. Philad. 1861, p. 290;Mon. Dipt. N. Amer. IV. p. 165, pl. II. fig. 1, 1869;Studies, II. p. 195, 1887.

"Two sub-marginal cells; four posterior cells; a discal cell; the second longitudinal vein originates at a more or less acute angle before the middle of the length of the wing and a considerable distance (more than the breadth of the wing) before the tip of the auxiliary vein; the sub-costal cross-vein is at a considerable distance (three lengths of the great cross-vein, or more) from the tip of the auxiliary vein; seventh longitudinal vein straight. Wings and their veins glabrous. Antennæ 16-jointed; three last joints of the flagellum abruptly smaller. Tibiæ without spurs at tip; ungues small, smooth on the underside, inserted under a projection of the last tarsal joint; empodia small,

but distinct. Forceps of the male with large, incrassated basal pieces, and a double claw-shaped horny appendage fastened to them on each side; ovipositor with flattened, curved, pointed upper valves and short lower ones." (Osten-Sacken).

341. TRIMICRA HIRTIPES, Walker.

Limnobia hirtipes (3), Wlk., List Dipt. Brit. Mus. I. p. 50, 1848; Trimicra Sydneyensis (Q), Schiner, "Novara" Exp. Dipt. p. 43, 1868; Trimicra hirtipes, O.-Sacken, Mon. Dipt. N. Amer. IV. p. 167, 1869.

♂.—Length of antennæ	0.085 inch	 2·14 millimètres.
Expanse of wings	0.300×0.090	 7.62×2.27
Size of body	0.250×0.050	 6.34×1.27

Q.—Length of autennæ.... 0.060 inch ... 1.54 millimètres. Expanse of wings..... 0.300×0.090 ... 7.62×2.27 Size of body...... 0.260×0.050 ... 6.62×1.27

Head covered with a greyish or yellowish-grey bloom, traversed on the front by black median line; rostrum, palpi and antennæ brown or black, basal joints of latter testaceous or brownishochreous. Thorax covered with a yellowish-grey bloom, with three brown or blackish stripes; intermediate one somewhat shining anteriorly, interrupted immediately before suture, but extending beyond it posteriorly; lateral ones short, not so distinct, but also extending beyond suture; humeral pits and suture black; humeri yellowish; pleuræ more or less ochreous, hoary, with two brown or blackish stripes, one from base of fore coxe to root of halteres, the other above the intermediate and hind coxæ; scutellum ochreous, tinged with brown; metanotum sooty brown, hoary. Halteres infuscated, the stem more or less yellowish. Abdomen deep fuscous brown or black, shining, with yellowish hairs (more dense in 3); lateral and posterior borders of segments with a narrow margin of ochreous or brownish-ochreous; genitalia brownish-ochreous. Legs testaceous; in 3 densely clothed with long, semi-erect blackish hairs; in Q with inconspicuous decumbent hairs; femora with a broad ring of brown or blackish immediately before tip; tibiæ brown or blackish at tip; tarsi deep brown or black. Wings slightly tinged with brownish; veins brown or blackish; tip of first longitudinal vein, the marginal cross-vein, præfurca, bases of sub-marginal cells, and fifth longitudinal vein often distinctly infuscated; stigma pale brownish. Auxiliary vein reaching costa before, opposite, or beyond marginal cross-vein; marginal cross-vein a little beyond inner end of first sub-marginal cell; discal cell often with a short stump of a vein from lower basal angle of second posterior cell; great cross-vein situated a little before inner end of discal cell.

Hab.—Swan River, W. Australia (Walker); Adelaide S. Australia (J. G. O. Tepper), Coll. S. Aust. Museum; Sydney, &c., N.S.W. (Masters and Skuse). Extremely abundant during August, September, and October.

Obs.—Schiner's T. Sydneyensis is certainly the female of Walker's species. Some specimens before me are larger than the above measurements, others are less than two-thirds the size. I can see very little other variation apart from sexual differences. More than one hundred specimens before me for comparison.

342. TRIMICRA MICROCEPHALA, Thomson.

Limnobia microcephala, Thomson, "Eugenia" Exp. Dipt. p. 446, 1868.

₹.—Length of antennæ	0.055 inch		1·39 millimètres.
Expanse of wings	0.250×0.060		6.34×1.54
Size of body	0.180×0.025	•••	4.56×0.62

Q.—Length of antennæ	0.050 inch	•••	1·27 millimètres.
Expanse of wings	0.250×0.060	•••	6.34×1.54
Size of body			

Remarkably like the preceding in colouring and markings, but smaller. Legs of both sexes inconspicuously clothed with short hairs; obscure testaceous; femora gradually darkening into deep brown or blackish towards the tip; extreme tip of tibiæ and the tarsi deep brown or blackish. Wings sub-hyaline, very slightly tinged; veins brown or blackish; cross-veins sometimes scarcely perceptibly infuscated; stigma pale brownish. The discal cell in certain specimens shows a tendency to open posteriorly; the anterior branch of fourth longitudinal vein in some instances originating with a short arcuation, and the discal cell closed with a pale cross-vein.

Hab.—Sydney; abundant during August, September and October (Masters and Skuse).

Obs.—Thomson's species, which is certainly not a Limnobia on account of its 16-jointed antennæ, nor a Limnophila because of its spurless tibiæ, seems undoubtedly to be identical with the smaller of our two common Sydney Trimicræ.

Genus 16. GNOPHOMYIA, O.-Sacken.

Gnophomyia, O. Sack., Proc. Acad. N. Sc. Philad. p. 223, 1859;
Mon. Dipt. N. Amer. IV. p. 172, t. 2. f. 5 (wing), t. 4. figs. 19
and 19a (forceps and ovipositor), 1869; Studies II. p. 198, 1887.

"Two sub-marginal cells; four posterior cells; a discal cell; the second longitudinal vein originates somewhat before the middle of the anterior margin, a considerable distance anterior to the tip of the auxiliary vein; præfurca very slightly arcuated at the basis, nearly straight; sub-costal cross-vein at a small or moderate distance (hardly exceeding the length of the great cross-vein) from the tip of the auxiliary vein; seventh longitudinal vein nearly straight. Wings glabrous. Antennæ 16-jointed. Tibiæ without spurs at the tip; tarsi with distinct empodia. The forceps of the male consists of two comparatively short basal pieces, and a pair of claw-shaped horny appendages; a second pair of horny appendages, below the first, is shorter and stouter." (Osten-Sacken).

53

343. GNOPHOMYIA FASCIPENNIS, Thomson. (Pl. xxi., fig. 14). Q wing).

Limnobia fascipennis (Q), Thoms., "Eugenia" Exp. Dipt. p. 447, 1868; Gnophomyia cordialis (3), O.-Sacken, Studies on Tipulidæ, II. p. 199, 1887.

♂.—Length of antennæ	0.065 inch	 1.66 millimètres.
Expanse of wings	0.230×0.060	 5.84×1.54
Size of body	0.240×0.040	 6.09×1.01

Q.—Length of antennæ 0.065 inch ... 1.66 millimètres Expanse of wings..... 0.230×0.060 ... 5.84×1.54 Size of body..... 0.280×0.040 ... 7.10×1.01

3 and Q .- Head black above, yellowish beneath; rostrum somewhat prolonged, in & yellow or reddish-yellow, in Q reddishbrown or even black; palpi brown or black; antennæ brown or black in 3, first joint of scapus at apex and basal half of second usually tinged with reddish-yellow or brownish, in Q both joints, except tip of second, yellow or reddish-yellow, the first joint often brownish above. Thorax reddish-yellow or yellowish-ferruginous, nitidous; a deep black spot on the mesonotum, usually larger and more pyriform in Q, generally squarish in 3; two lateral deep black stripes from below humeri to scutellum (rarely confluent anteriorly with the first spot), emitting a short branch in front of root of wings; metanotum with a large black truncate-cordiform spot (in one 3 specimen the spot is absent, whilst in a Q the metathorax is entirely deep brown, or black). Halteres yellowish, with infuscated club. Abdomen in & (including genitalia) reddish-yellow or yellowish-ferruginous, in Q superior segments deep and shining bluish or violaceous-black; the venter and ovipositor as in 3. Legs pale brownish- or reddish-yellow, tips of femora and tibiæ usually brownish; tarsi more or less deeply infuscated. Wings in 3 with a brownish tint, usually with two, often with three and sometimes without sub-hyaline spots, the first very

small before origin of second longitudinal vein, second larger, illdefined, preceding the cross-veins, third a narrow shortened cross-band from tip of second longitudinal vein; in Q fuscous, with a distinct spot and two fasciæ situated as in 3, the latter stretching almost across the wing, anal angle more or less subhyaline; stigma not noticeable; veins dark. Auxiliary vein reaching costa about midway between origin of second longitudinal and marginal cross-vein; sub-costal cross-vein situated before its tip a distance 1 longer than great cross-vein; præfurca straight, very slightly arcuated at base; marginal cross-vein at or a little beyond inner end of sub-marginal cell, sometimes not far from tip of first longitudinal; petiole of first sub-marginal cell about length of distance between tip of præfurca and small cross-vein; cross-vein closing inner end of discal cell usually almost obliterated; great cross-vein situated more or less beyond inner end of discal cell.

Hab.—Australia (Lotz., 1834, Vienna Mus.); Sydney (Eugenia Exp.); several localities in N.S.W. (Masters and Skuse). September to January. Twenty-five male and twelve female specimens are before me.

Obs—I had already referred Thomson's species to Gnophomyia when I discovered that Baron O.-Sacken had described the ♂ as another species under this generic title. The Baron also describes in the same paper (Studies II. p. 199), a species of Gnophomyia from Amazon River which be calls fascipennis, but this name being pre-occupied I would suggest that Osten-Sackeni be substituted in honour of the describer.

Genus 17. GONOMYIA, Megerle.

Gonomyia, Meg., in litt., Meigen, Syst. Beschr. I. p. 146, 1818; Taphrosia, Rondani, Prodr. I. 1856; Gonomyia, O.-Sacken, Proc. Acad. Nat. Sc. Philad. III. p. 229, 1859; Goniomyia (amended name), O.-Sack., Mon. Dipt. N. Amer. IV. p. 176, pl. II. figs. 2

and 4 (wings), pl. IV. fig. 17 (genitalia), 1869; Gonomyia, O.-Sack., Studies, II. p. 200, 1887.

"One or two sub-marginal cells; the first, when present, very short, sub-triangular, owing to the shortness and the oblique direction of the anterior branch of the second longitudinal vein; no marginal cross-vein; four posterior cells; discal cell open or closed; when open it is coalescent with the third posterior cell; wings glabrous. Antennæ 16-jointed, rather short. Feet long, slender; tibiæ without spurs at the tip; tarsi with distinct empodia. Forceps of the male with several branches and linear appendages. Ovipositor of the female slender, arcuated," (Osten-Sacken).

I cannot do otherwise than place the following species in this genus, though it seems to deviate in certain particulars from the normal type of *Gonomyia*; chiefly in the great length of the auxiliary vein, the structure of the discal cell and situation of the great cross-vein (which reminds one of *Gnophomyia*), and lastly in the uniform dull dark colouring of the body and legs, instead of the usually yellow colour. I regret that I have not seen a male specimen, in order to compare the structure of the forceps. This species cannot be well included in any of the five sections of the genus which have been recently defined by Baron O.-Sacken (Studies, II. pp. 201-202).

344. Gonomyia leucophæa, sp.n.

Q.—Length of antennæ	0.047 inch		1·18 millimètres.
Expanse of wings	0.320×0.070	•••	$8 \cdot 12 \times 1 \cdot 77$
Size of body	0.260 × 0.030		6.62×0.76

^{*} With merely individual exceptions, according to Baron O.-Sacken. But in the species now described, it is unmistakably the posterior branch of the fourth vein which is forked, so that in specimens with the discal cell open, the latter would be coalescent with the second posterior cell.

Cinereous, opaque. Rostrum, palpi and antennæ black; joints of flagellum elliptical, with very short hairs. Thorax with two longitudinal rows of very short yellowish hairs. Halteres with an ochreous stem and dusky brown club. Abdomen very sparingly pubescent; ovipositor shining brown, the lower valves ochraceous. Coxe pale greyish-ochreous, the fore pair more cinereous. mainder of joints sooty brown, their pubescence with a greyish reflection; base of femora slightly testaceous-brown. Ungues smooth; empodia distinct. Wings slightly greyish, greyishochreous at their origin; stigma very pale brownish-grey; veins sooty-brown. Auxiliary vein very long, reaching costa some distance beyond inner end of second sub-marginal cell and opposite the tip of fifth longitudinal vein; sub-costal cross-vein situated a short distance before its tip, equal to the length of great cross-vein; præfurca strongly arcuated at its origin; petiole of first sub-marginal cell forming an obtuse angle with præfurca at the small cross-vein, about equal in length to posterior branch of its fork; the distance between the tip of the first longitudinal and that of the anterior branch of the second longitudinal equal to the distance between both tips of the latter fork; inner end of second sub-marginal cell pointed (there is a distinct incrassation at this point) opposite inner end of first posterior cell; third longitudinal vein almost straight, slightly thicker than the neighbouring veins; discal cell elongated, its arcuated inner end situated considerably before the inner end of first posterior cell, the cross-vein closing its outer end situated opposite a point mid-way between the tip of the posterior branch of fourth longitudinal and tip of fifth longitudinal; the posterior branch of fourth longitudinal vein forked, the branch originating at a gentle arcuation opposite tip of fifth longitudinal vein; great cross-vein some distance beyond inner end of discal cell.

Hab.—Sydney; September (Skuse).

Obs.—Described from a single specimen.

Genus 18. Rhabdomastix, gen.nov.

Two submarginal cells, the first half the length of the second; four posterior cells; no marginal cross-vein; præfurca long, originating at an acute angle before the middle of the wing; discal cell small; wings glabrous. Antennæ 16-jointed, very long, filiform, nearly twice the length of the entire body. Legs long, slender, tibiæ without spurs at the tip; ungues small, smooth; empodia indistinct. Male forceps with an outer, straight, slender, horny appendage, microscopically serrated on the outer side, and an inner short, soft, elliptical one; also two long, slender, somewhat hooked, internal appendages (Pl. xxiv., fig. 57).

Rostrum and palpi short; antennæ very long; joints of the scapus equal in size, very small, globose; flagellar joints long, slender, cylindrical, evenly but not densely pilose, somewhat decreasing in length; last joint apparently terminated by a minute nipple-shaped projection. Front broad, convex; eyes glabrous, small, round, considerably separated on the under side. Collare short; suture of thorax very distinct. Halteres long, slender. Legs densely clothed with a minute pubescence. Wings very cuneiformly narrowed towards the base, with only a slight indication of an anal angle; glabrous, appearing as if covered with microscopic dots under a high power; veins glabrous, or almost so; stigma wanting. The tip of the auxiliary vein is some distance beyond the origin of the second longitudinal vein; the subcostal cross-vein wanting or only extremely indistinctly present at the tip of auxiliary vein; præfurca originating in a rather acute angle considerably before the middle of the wing; first longitudinal vein joining costa opposite distal end of discal cell; the anterior branch of the second longitudinal vein is short, shorter than the great cross-vein; petiole about one half the length of first sub-marginal cell; marginal cross-vein entirely wanting; inner ends of second sub-marginal, first posterior and discal cells in one line; small or anterior cross-vein as long or somewhat longer than the great cross-vein, almost as long as the discal cell; discal cell small,

hexagonal, longer than wide; the great cross-vein situated at or beyond the middle of its length; fifth, sixth and seventh longitudinal veins gently arcuated; the last short, scarcely reaching to one-third the length of the wing.

345. Rhabdomastix Osten-Sackeni, sp.n. (Pl. XXII., fig. 15).

 \mathcal{J} .— Length of antennæ.....
 0.250 inch
 6.34 millimètres.

 Expanse of wings......
 0.180×0.040 4.56×1.01

 Size of body.......
 0.145×0.020 3.66×0.50

Front dull brown; rostrum brownish or ochreous-brown; palpi and antennæ brown, the latter nearly twice the length of the body. Thorax dull brown, the scutellum sometimes more ochreous-brown. Halteres long and slender, brownish. Abdomen brown, clothed with short brownish hairs; forceps brownish-ochreous. brown or ochreous-brown, with a light sericeous reflection in a certain light; the tarsi white. Wings pellucid, almost hyaline, glabrous, granulate on account of being covered with microscopic dots which represent rudimentary pubescence; margaritaceous reflections; veins greyish-brown. Auxiliary vein reaching costa at a point not quite half the distance from origin of second longitudinal vein to inner end of second sub-marginal cell; præfurca almost imperceptibly bent at its origin, almost straight, nearly equal in length to the remainder of the second longitudinal; the third longitudinal and following veins at apex of wing all gently arcuated posteriorly.

Hab.—Berowra, N.S.W. Three specimens in August (Masters and Skuse).

Obs.—I have named this species in honour of Baron Osten-Sacken, who has so greatly advanced Dipterology; especially by his unsurpassed knowledge of, and excellent publications, on Tipulidæ.

Genus 19. LECHRIA, gen.nov.

Two sub-marginal cells, the first very short, sub-triangular; four posterior cells; no marginal cross-vein, but inner marginal cell closed by first longitudinal vein, which ends at inner end of first sub-marginal cell; small cross-vein situated some distance before inner end of second sub-marginal cell; præfurca originating beyond the middle of the wing; discal cell closed, elongated, its inner half cuneate, and its inner end situated before origin of præfurca; wings glabrous. Antennæ 16-jointed, short. Feet long, slender; tibiæ with spurs; ungues small, smooth; empodia indistinct. Male forceps with two horny appendages; an outer linear one, and a longer somewhat hooked inner appendage; also five long, horny, needle-like processes of the internal apparatus (Pl. xxiv., fig. 58).

Rostrum nearly half the length of the head; palpi of moderate length, the first joint apparently slightly the longest, the last three rather thicker, equal. The antennæ little longer (if any) than the head; joints of scapus somewhat thick, sub-cylindrical, the first rather longer than the second; flagellar joints sub-cylindrical, with very short hairs. Eyes contiguous above, and almost so on the under side. Collare inconspicuous. Legs clothed with only a microscopic pubescence. Wings very cuneiformly narrowed towards the base, with only a slight anal angle; appearing covered with microscopic dots only under a high power; the veins at apical end of wings densely beset with minute hairs; stigma narrow, elongate, enveloping terminal portion of first longitudinal vein. The tip of auxiliary vein is opposite the end of præfurca and the small cross-vein; the sub-costal cross-vein at its tip; præfurca very short, originating at an angle; the first longitudinal gently arcuated into the second longitudinal, joining at the base of its fork: the first sub-marginal cell is very short; the anterior branch of the second longitudinal fork about half the length of the posterior, the latter converges towards the tip of the third longitudinal, and is equal in length to the petiole; second sub-marginal cell also with a short petiole; the small cross-vein situated a little

beyond middle of discal cell; the latter closed, elongated, its inner half cuneiformly narrowed, and its inner end a little before the origin of præfurca; the great cross-vein a short distance beyond inner end of discal cell; fourth longitudinal vein originating in fifth longitudinal at a little before one third the length of the wing, joined at its base to first longitudinal by a short cross-vein; fifth, sixth and seventh longitudinal veins straight.

The most striking peculiarities in the venation are, the course of the first longitudinal which terminates in the second, the absence of the marginal cross-vein, the first and second sub-marginal cells being both petiolate, the position of the small cross-vein, and lastly the shape and position of the discal cell.

This genus seems undoubtedly related to Gonomyia.

346. LECHRIA SINGULARIS, Sp.n. (Pl. XXII., fig. 16).

 \mathcal{J} .—Length of antennæ.0.040 inch1.01 millimètres.Expanse of wings. 0.210×0.057 5.33×1.44 Size of body. 0.180×0.033 4.56×0.84

Head blackish or sooty brown. Rostrum, palpi and antennæ dark brown. Thorax brown, opaque, with a yellowish-grey bloom in a certain light. Halteres yellow, with slightly infuscated club. Abdomen brown, the venter more ochreous; forceps yellow. Legs dull ochre-yellow, the tips of the femora and the last three joints of tarsi infuscated. Wings hyaline, appearing covered with microscopic dots only under a high power; stigma long, narrow, brownish; veins brown. The venation as described in the particulars of generic characters.

Hab.—Wheeny Creek, Hawkesbury District. One specimen in January (Skuse).

Genus 20. Trentepohlia, Bigot.

Trentepohlia, Bigot, Ann. Soc. Ent. Fr. (3rd ser.) II., p. 473, 1854; Mongoma, Westwood, Trans. Ent. Soc. Lond. 1881, p. 364,

pl. xvii., fig. 1; O.-Sacken, Berl. Ent. Zeits. XXVI., p. 89, 1882; Studies, II., p. 203, 1887; *Trentepohlia*, Bergroth, Ent. Tidsk. 1888, p. 136, fig. 3 (wing).

Two sub-marginal cells; the first very short; second in immediate contact with the discal cell, consequently the small cross-vein is wanting; marginal cross-vein situated before the inner end of the first sub-marginal cell; discal cell open or closed; three or four posterior cells; anal cell closed; auxiliary vein reaching costa usually a very short distance before the tip of the first longitudinal vein. Antennæ 16-jointed. Tibiæ without spurs; tarsi without empodia.

I do not know sufficient about the species having only three posterior cells to criticise the above synonymy, but accept them as congeneric with those possessing four, on the authority of Dr. Bergroth. Baron Osten-Sacken has more than once suggested the relationship of *Limnobia Trentepohli*, Wied., and *Cylindrotoma albitarsis*, Dolesch., with Westwood's *Mongoma*, but the descriptions appear too incomplete to satisfactorily decide. In the above diagnosis I have combined the principal characters of the two sections.

In the species now described the tips of the auxiliary and first longitudinal veins join the costa at rather widely separate points (which also seems to be the case with *T. exornata*, Bergr.), thus differing from *T. fragillima*, Westw., and *T. tenera* and *pennipes*, O.-Sack., in which they terminate close together. (Pl. xxiv., fig. 59, forceps).

Two specimens in the Macleay collection, from Fiji Islands, are possibly distinct from *T. australasiæ*, but at any rate belong to a closely allied species. The auxiliary and first longitudinal veins are separated as in the Australian example; the præfurca is rather more than twice the length of the distance between the origin of the third longitudinal vein and the inner end of the discal cell;

the cross-vein closing the discal cell is situated, in one specimen at, in the other somewhat before, the base of the anterior fork. All have the base of the third posterior cell before that of the second posterior cell. The Fijian form has considerably longer legs (42 mm.); the white on the knees extends equally (2 mm.) on the femora and tibiæ; the apical third of the tibiæ is white; and the extreme base and rather more than the apical half of the metatarsus, with the remainder of the tarsal joints, white; also, the wings are longer than in T. australasiæ.

TABULATION OF HITHERTO DESCRIBED SPECIES.*

- A. Posterior branch of the fourth longitudinal vein forked. Four posterior cells. Discal cell closed.
 - a. Tips of the auxiliary and first longitudinal veins in close proximity. Tarsi entirely white.
 - * Intermediate tibiæ with a short fringe of white hair on each side at the apex.

pennipes, O.-Sack. Studies II., p. 204. Borneo.

**Intermediate tibiæ simple. Tibiæ entirely white.

tenera, O.-Sack., Berl. Ent. Zeits., XXVI., p. 89.

Phillippine Is.

Tibiæ fuscous, white at the base and apex.

fragillima, Westw., Trans. E. Soc. Lond. 1881, p. 364. Africa.

- b. Tips of the auxiliary vein and first longitudinal veins considerably remote. Tarsi brown towards the base. australasiæ, sp.n.
- B. Posterior branch of the fourth longitudinal vein simple. Three posterior cells.
 - a. Discal cell open. Tarsi fuscous.

^{*} Based upon that of Dr. Bergroth (Ent. Tidsk., 1888, p. 136).

* Abdomen yellow, brownish-black at apex. Wings fuscous at apex.

Trentepohli, Wied., I. p. 551. Sumatra.

- ** Abdomen entirely fuscous-black. Wings with the apex and a middle transverse fascia of fuscous.

 exornata, Bergr. Ent. Tidsk., 1881, p. 135. Africa.
- b. Discal cell closed. Tarsi white.
 albitarsis, Dolesch., II., Bijdr., p. 15. Java
- 347. TRENTEPOHLIA AUSTRALASIÆ, Sp.n. (Pl. XXII., fig. 17).
- \bigcirc .—Length of antennæ.....— inches ...— millimètres.Expanse of wings...... 0.250×0.055 ... 6.34×1.39 Size of body....... 0.220×0.030 ... 5.58×0.76

In the single specimen before me the head is wanting, and the thorax has been almost entirely destroyed by the pin. Thorax apparently ochreous. Halteres ochreous. Abdomen umber-brown, the first two or three segments ochreous beneath. Legs about 35 mm, in length. Coxæ ochreous. Femora and tibiæ brown; the femora white at apex (about 1 mm.), and the tibiæ very slightly white at base and considerably tipped (about 3 mm.) at apex. Tarsi yellowish, the basal half of the metatarsus deepening into brown. Wings sub-hyaline, tinted with brownish between the auxiliary and first longitudinal veins for the whole of their length; beautiful violaceous and cupreous reflections; veins dark brown. Auxiliary veins reaching costa opposite anterior extremity of marginal cross-vein, and separated a distance equal to the length of the latter from tip of first longitudinal vein; sub-costal cross-vein situated some distance before tip of auxiliary vein, and opposite posterior extremity of great cross-vein; first longitudinal vein extending beyond marginal cross-vein a distance equal to the length of latter; second longitudinal originating at \(\frac{1}{3} \) the length of wing; præfurca a little longer than distance between origin of

third longitudinal vein and inner end of discal cell; great cross-vein situated a little before inner end of discal cell.

Hab.—Barron River, Northern Queensland (Froggatt). A single damaged specimen.

Genus 21. Conosia, v.d. Wulp.

Conosia, v.d. Wulp, Tijds. v. Entom. XXIII., p. 159, pl. x., figs. 5-7., 1880; O.-Sacken, Studies, II., p. 206, 1887.

Two sub-marginal cells; five posterior cells; a discal cell; auxiliary vein very long; sub-costal cross-vein situated before its tip a distance about equal to length of great cross-vein; marginal cross-vein joining the first sub-marginal cell near its inner end; small cross-vein situated at or beyond the distal end of the discal cell. Palpi short, one-jointed. Antennæ 12-jointed. Tibiæ without spurs; empodia distinct; ungues long, smooth.

The palpi clearly consist of only one joint (Pl. xxiv., fig. 60, mouth parts) though Van der Wulp states that there are four, and figures them. Rostrum extremely short. Antennæ short, about one-third longer than the head; first joint thick, cylindrical, about one-third the length of entire antennæ; second globose, as wide as the first; third somewhat narrower, ovate; fourth and following joints small; the fourth globose, the rest gradually becoming more elongate until the terminal one is almost linear and about twice the length of the next preceding joint; verticillatepilose (Pl. xxiv., fig. 61). Van der Wulp says "antennæ 14-articulatæ," but I think that the slender terminal joints have deceived him. The head is flattened, somewhat longer than broad; front broad, with an impressed line on each side; eyes round. Thorax gibbose, rather long, strongly projecting over the hinder portion of the head; a distinct small pit on each side behind the humeri; scutellum rather large, almost the width of the thorax; metathorax somewhat steep. Abdomen long, slender, cylindrical; male forceps

Limnophila-like, consisting of two sub-cylindrical basal pieces, with a horny claw-like appendage at apex, underneath which is a soft, somewhat pointed appendage (Pl. xxiv., fig. 62). Legs somewhat stout; the fore femora abruptly attenuated for their basal third. Wings shorter than the abdomen, tolerably broad, and a little dilated about the middle of the anterior margin. The veins above the third longitudinal have their tips slightly arcuated anteriorly, those below it have them arcuated posteriorly. Between the costa and auxiliary veins, beyond the origin of the præfurca, there is usually a variable quantity of venous reticulation, apparently originating in the costa, and sometimes actually forming distinct cross-veins. In all the specimens before me the auxiliary vein reaches the costa beyond the marginal cross-vein, the distance being somewhat variable; however, according to Van der Wulp's figure, the auxiliary vein in his specimen joins the costa some distance before the marginal cross-vein.

The first longitudinal vein ends in the costa near the posterior end of the stigma, and opposite a point a little beyond the distal end of the discal cell; according to Van der Wulp's figure it should join considerably before this, and opposite the origin of the third longitudinal vein. The marginal cross-vein is very oblique and has its posterior end generally opposite the tip of the auxiliary vein or thereabouts. The præfurca is a little shorter than the first sub-marginal cell, rather straight, but a little arcuated near its origin. The first sub-marginal cell commences a little before the second. The most remarkable character in the venation is that the small cross-vein is situated at the distal end of the discal cell, a position it is unknown to occupy in the wing of any other member of the family; on account of the position of the cross-vein the first posterior cell is unusually short; its inner end is more or less beyond the distal end of the discal cell. The discal cell is almost triangular, a little angular at the joining of the great cross-vein. The great cross-vein is situated a short distance beyond the inner

end of the discal cell, and is sometimes somewhat sinuous. Seventh longitudinal vein bisinuated towards its tip.

348. Conosia irrorata, Wiedemann.

Limnobia irrorata, Wied., Auss. Zweifl. I., p. 574, 1828; Limnophila Crux, Doleschall, Nat. Tijds. N. Ind. XIV., p. 388, pl. IV., f. 3, 1856 (?); Conosia irrorata, v. d. Wulp, Tijds. v. Entom. XXIII., p. 161, pl. x., figs. 5-7, 1880; Osten-Sacken, Studies II., p. 206, 1887.

Greyish-ochreous, dull; the pubescence on the thorax and abdomen usually centred in minute brownish dots. Thorax with a more or less distinct brownish line, usually uninterrupted from collare to posterior border of metanotum. Clubof halteres brownish. Abdomen more or less tinged with brownish, particularly the terminal segments; clothed with yellowish hairs; of forceps concolorous with rest of body; of ovipositor slightly curved upwards; upper valves shining testaceous, lower ones black. Coxe and femora usually pale ochreous-yellow; last one or two tarsal joints brown. Wings irregularly spotted with clouds of brown in the costal (over the venous reticulation) and marginal cells; a rather prominent pointed streak of brown directed downwards to and enveloping the basal portion of third longitudinal vein; also origin of præfurca, basal half of great cross-vein and (often) tip of seventh longitudinal vein clouded with brown; the veins ochreous, all

numerously spotted with brown; stigma brown, rather paler than the markings.

Hab.—Sydney and other localities in N.S.W., May to October. (Masters and Skuse); Brisbane, Queensland, (Mr. H. Tryon); usually found among grass.

Obs.—Two specimens in the Macleay collection labelled Nepaul and Fiji respectively, do not seem to exhibit any characters which would lead one to separate them from this species. The same remarkable species it appears also occurs in Borneo, Ceylon, China and the Arabian Desert.

Section IV. LIMNOPHILINA.

"Two sub-marginal cells; usually five, seldom four posterior cells; discal cell generally present; sub-costal cross-vein posterior to the origin of the second longitudinal vein, usually closely approximated to the tip of the auxiliary vein (considerably distant from it in *Trichocera* only). Eyes glabrous (pubescent in *Trichocera*). Normal number of antennal joints sixteen. Tibiæ with spurs at the tip; empodia distinct; ungues smooth." (Osten-Sacken).

The Section Limnophilina includes about a dozen recognized genera. The genera *Gynoplistia* and *Cerozodia*, peculiar to the Australian region, possess remarkable characters and are closely allied; the former seems numerous, but only two species of *Cerozodia* have been described. *Ctedonia*, Phil., from Chili, to which *Gynoplistia fusca*, Jaen., is referred, is, according to Baron Osten-Sacken, closely allied to *Cerozodia*. Except *Limnophila*, the other genera contain but few known species.

Genus 22. Limnophila, Macquart.

Limnophila, Macq., S. à B. Dipt. I. p. 95, 1834; Limnomya, Rondani, Prod. etc., IV. Corrigenda, 1861; Limnophila, O-Sacken, Mon. Dipt. N. Amer. IV. pp. 196-202, pl. 2, f. 6-10 (wings); pl. 4, f. 23-27 (genitalia), 1869; Studies, II. p. 209, 1887.

"Two sub-marginal cells; usually five, seldom four posterior cells; discal cell closed; sub-costal cross-vein posterior to the origin of the second longitudinal vein, usually closely approximated to the tip of the auxiliary vein. Wings glabrous. Eyes glabrous. Antennæ 16-jointed. Tibiæ with spurs at the tip; empodia distinct; ungues smooth." (Osten-Sacken.)

The genus is of universal distribution; its numerous species are remarkable for their discordant characters, some of which at first sight seem of too much importance to be merely specific, being in many cases common to a natural group of two, three, or more species, yet doubtfully of generic value; the entire assemblage of groups and isolated species being bound together by a tie which renders dismemberment difficult and unsatisfactory. Though the species are classified under two sections,—those with four, and those with five posterior cells to the wings,—this division is clearly far less natural than it is convenient; for some species in one section are found to be certainly more related to those in the other than they are to the species with which they are associated. It also seems impossible to attach more than specific importance to the length of the antennæ, which varies tremendously even in closely allied species. Baron Osten-Sacken considers that "the most reliable characters to guide us are those taken from the structure of the male forceps; but in order to be available, they must be supported by characters supplied by other parts of the organization." Working on this rule, he found it only possible to provisionally admit a few sub-generic divisions which await better definition, and to point out some groups of species which appear allied.

One species now described, L. aureola, approaches, but does not entirely correspond with, Baron Osten-Sacken's L. recondita and imbecilla group; and another, L. rostrifera clearly belongs to his L. luteipennis group; all the other species appear only to add to the perplexity of forms already known, though a few certainly couple together in groups. We must await further discoveries before this genus can be understood, or a satisfactory classification

of the species effected. Some species must be left in abeyance on account of the male sex being at present unknown.

I. FIVE POSTERIOR CELLS.

349. LIMNOPHILA LEUCOPHÆATA, sp.n. (Pl. XXII., fig. 18).

Q.—Length of antennæ 0.120 inch ... 3.04 millimètres. Expanse of wings..... 0.400×0.090 ... 10.16×2.27 Size of body..... 0.440×0.050 ... 11.17×1.27

Head brown, with a yellowish-grey bloom; front with a slightly darker median line; rostrum and palpi dark brown or blackish; antennæ brown, the two basal joints more or less ochreous; flagellar joints sub-cylindrical, slender, the first five or six becoming larger beneath at the apex; with short bristly verticils. Thorax brown, opaque, pruinose with greyish, with three more or less distinct narrow stripes; intermediate one terminating midway between collare and suture, and lateral ones reaching the suture; an almost crescent-shaped marking behind the humeral pits, stretching from below extremity of lateral stripes almost to suture; pleuræ with a pale greenish-ochreous, ochreous, or even sordid testaceous stripe from collare to scutellum (including origin of the wings), followed by a deep brown or black stripe which terminates at metanotum; the remainder brown or brownish; scutellum more or less tinged with yellowish or testaceous. Halteres infuscated, the base of stem ochreous. Abdomen deep brown, levigate; ovipositor long, slightly curved, the valves tinged with testaceous. Coxe whitish to reddishochreous. Femora sordid or greyish-yellow, deepening into black before the tip, the tip white; tibiæ black or deep brown, with a moderately broad ring of white at base, and slightly tipped with white; tarsi white, except that in the fore legs the metatarsal joint is brown (just beyond the base) for half its length. Wings tinged with pale brownish for three-fourths of their length, the anterior margin brown to stigma, and the veins at apex with

several small brown clouds; the clear spaces in the wings almost whitish; a squarish space a little before origin of prefurca, followed by another of uncertain shape about middle of præfurca; the fourth and fifth longitudinal veins are more or less distinctly clouded at intervals with brown or brownish; a rather prominent brown spot at tip of anterior branch of second longitudinal vein; veins and stigma brown. Auxiliary vein reaching costa opposite the middle of petiole of first sub-marginal cell; the sub-costal cross-vein opposite inner end of second sub-marginal cell; subcostal cell a little expanded just before the tip of first longitudinal vein; prefurca moderately long, straight except at the base; petiole of first sub-marginal cell usually about one-third the length of the præfurca; marginal cross-vein a little nearer inner end of first sub-marginal cell than to tip of first longitudinal vein; branches of second longitudinal, particularly the posterior one, arcuated; second sub-marginal cell longer than the first posterior cell by a distance equal to length of great cross-vein; second posterior cell about half the length of the first posterior cell; great cross-vein at inner end of discal cell; tips of fork of posterior branch of fourth longitudinal considerably, and tips of fifth and sixth longitudinal vein slightly arcuated; seventh longitudinal vein conspicuously sinuated.

Hab.—Neutral Bay and Middle Harbour, near Sydney (Skuse). On wet rocks near waterfalls in May and November.

350. LIMNOPHILA OBSCURIPENNIS, sp.n. (Pl. XXII., fig. 19).

♂.—Length of antennæ	0.080 inch	2.02 millimètres.
Expanse of wings	$0.340 \times 0.075 \dots$	8.62×1.89
Size of body	$0.260 \times 0.040 \dots$	6.62×1.01
- T 1 0	0.000 1 1	2.00

Q.—Length of antenne.... 0.080 inch ... 2.02 millimètres. Expanse of wings.... 0.340×0.075 ... 8.62×1.89 Size of body..... 0.320×0.040 ... 8.12×1.01

Head brown, with a yellowish-grey bloom; rostrum, palpi and antennæ dark brown; first flagellar and apex of second basal joint usually ochreous-yellow; flagellar joints becoming very slender and cylindrical towards tip, the first flagellar joints elliptical; short bristly verticils. Thorax brown, with four pale, ochreous or greyish, narrow stripes; two intermediate ones stopping just before the suture; the lateral ones extending opposite the origin of the wings. Halteres brown. Abdomen brown; & forceps brown, of ordinary structure; Q ovipositor long, a little curved, testaceous or ochreous. Legs light ochreous, densely clothed with tolerably long hairs; tibiæ and tarsi brownish at the tips. Wings almost completely tinged with brownish; the extreme apex clear whitish, usually from tip of anterior branch of second longitudinal to tip of anterior branch of fourth longitudinal vein; also usually a small whitish clear space at each end of stigma; stigma and veins brown. Auxiliary vein reaching costa about opposite inner end of second sub-marginal cell; sub-costal cross-vein a short distance before its tip; sub-costal cell a little expanded just before tip of first longitudinal vein; præfurca moderately long, almost straight (quite straight and originating at a very acute angle in some specimens); petiole of first sub-marginal cell as long or longer than great cross-vein; marginal cross-vein pale, situated mid-way between inner end of first sub-marginal cell and tip of first longitudinal vein; branches of second longitudinal, especially the posterior, arcuated; second sub-marginal cell slightly shorter than first posterior cell; second posterior cell short, less than half the length of first posterior; discal cell rather elongate, its inner end situated before that of the first posterior cell a distance nearly equal to length of great cross-vein; inner end of fourth posterior cell before that of third posterior a distance about equal to length of great cross-vein; great cross-vein beyond inner end of discal cell; seventh longitudinal vein sinuated.

Hab.—Sydney, Berrowa and Knapsack Gully, Blue Mountains, N.S.W. (Skuse). April and August.

351. LIMNOPHILA DISPOSITA, Sp.n.

Q.—Length of antennæ.... 0.045 inch ... 1.13 millimetres. Expanse of wings.... 0.290×0.080 ... 7.35×2.02 Size of body..... 0.280×0.040 ... 7.10×1.01

Head and antennæ ochreous-brown; rostrum and palpi dark brown. Thorax ochreous-brown, dull, infuscated anteriorly, with indistinct traces of longitudinal stripes; pleuræ and metanotum pruinose with yellowish. Halteres yellow. Abdomen ochreousbrown, somewhat darker than thorax, a little shining, clothed with short yellow hairs; ovipositor tolerably long, slightly curved, tinged with testaceous. Legs yellowish-tawny or ochreous; femora with a brown ring just before tip; tibiæ and first three tarsal joints infuscated at tip; last two tarsal joints entirely infuscated. Wings pellucid, with a yellowish or pale brownish tint; veins brown; stigma hardly perceptible. Auxiliary vein reaching costa opposite or short distance beyond inner end of second sub-marginal cell; sub-costal cross-vein situated before tip a distance about equal to length of great cross-vein; præfurca short, considerably arcuated at base; petiole of first sub-marginal cell about half the length of præfurca; marginal cross-vein about midway between inner end of first sub-marginal cell and tip of first longitudinal vein; branches of second longitudinal vein divergent but little arcuated; inner ends of second sub-marginal, first posterior and discal cells in one line; second posterior cell very small, not half the length of the third posterior; discal cell oblong; great cross-vein situated about the middle of its length; seventh longitudinal vein curved at its tip.

Hab.—Sydney (Masters and Skuse). Two specimens during September.

352. LIMNOPHILA AUREOLA, sp.n. (Pl. XXII. fig. 20).

Q.—Length of antennæ..... 0.055 inch ... 1.39 millimètres. Expanse of wings...... 0.240×0.065 ... 6.09×1.66 Size of body..... 0.130×0.030 ... 3.30×0.76

Head, including rostrum, palpi, and antennæ light fulvous-yellow to brownish; flagellar joints slender, cylindrical, with spare bristly Thorax pale fulvous, somewhat shining, with two longitudinal rows of yellow hairs. Halteres yellow. Abdomen brown or brownish, more or less tinged with ochreous or fulvous; clothed with yellow hairs; & forceps of ordinary type, concolorous with rest of body; Q ovipositor nearly straight, ochre-yellow. Legs yellow, densely clothed with tolerably long yellow hairs; tibial spurs small. Wings pellucid, with a faint yellowish tint; veins vellowish; stigma indistinct; the origin of the præfurca with a small, but distinct, brownish cloud; cross-veins and tips of all the veins just perceptibly clouded. Auxiliary vein shorter than usual, reaching costa beyond origin of second longitudinal vein a distance equal to about length of great cross-vein; sub-costal cross-vein a little beyond origin of the latter; præfurca moderately long, angularly bent at its origin, with a short stump of a vein, the rest straight; petiole of first sub-marginal cell somewhat more than one-third the length of præfurca; marginal cross-vein situated at inner end of first sub-marginal cell, and only a little before tip of first longitudinal vein; second sub-marginal cell somewhat longer than first posterior; inner end of latter in line with that of discal cell; second posterior cell short, less than half the length of third posterior; discal cell oblong; great cross-vein situated at the middle of its length; seventh longitudinal vein a little curved at its tip.

Hab.—Lawson, Blue Mountains (Masters). Two specimens in January.

Obs.—This species seems to approach the L. recondita and L. imbecilla group of Baron Osten-Sacken; but the auxiliary vein is shorter and the base of the second longitudinal differs in being strongly angulated.

353. LIMNOPHILA OCELLATA, sp.n. (Pl. XXII. fig. 21).

♂.—Length of antennæ	0.040 inch	1.01 millimètres.
Expanse of wings	$0.210\times0.047~\dots$	$5 \cdot 33 \times 1 \cdot 18$
Size of body	$0.150\times0.020~\dots$	3.81×0.50
Q.—Length of antenne	0.040 inch	1.01 millimètres.

Expanse of wings. 0.250×0.060 ... 6.34×1.54 Size of body...... 0.210×0.030 ... 5.33×0.76

Head brown, with a yellowish-grey or brownish bloom; rostrum ochreous-brown or brownish; palpi and antennæ black; flagellar joints cylindrical, the first two or three more elliptical. Thorax covered with a yellowish-grey or brown bloom, with three brown stripes; intermediate stripe extending from collare to suture, marked with two small approximate shining dots at one third of its length from anterior extremity; lateral stripes short; humeral pits prominent, in a line with intermediate dots; pleuræ, scutellum and metathorax with a greyish bloom. Halteres pale yellow. Abdomen dark brown or blackish; & forceps dull ochreous or pale greyish-brown, the terminal appendages black, single, truncate, with a minute hook at the outer angle; Q ovipositor long, slender, very little curved, tinged with ochreous towards extremity. Coxe greyish-ochreous. Remaining joints brown to black. Wings with a slightly greyish tint, marked with brownish (more inky when fresh), chiefly coalescent ocellate, spots; an incomplete ocellus has the origin of præfurca for its centre, and is coalescent with another more or less complete ocellus reaching to the posterior margin; others are more or less distinct, centred round the crossveins, and generally coalescent; an ocellus at distal end of discal cell often distinct and very perfect; leaving two sub-hyaline transverse bands, the first opposite middle, the second opposite tip, of auxiliary vein. Auxiliary vein rather short, reaching costa opposite middle of præfurca; sub-costal cross-vein situate beyond origin of præfurca a distance equal to length of great cross-vein; præfurca bent at an obtuse angle near its base, sometimes with a short stump of a vein, the rest straight, twice (or more) the length of petiole of first sub-marginal cell; marginal cross-vein usually indistinguishable, situated at or before inner end of first sub-marginal cell, and a little before tip of first longitudinal vein; inner ends of second sub-marginal and first posterior cells in one line; small cross-vein arcuated; second posterior cell usually less than half the length of the third posterior; discal cell elongate, as long or longer than third posterior cell; great cross-vein situated beyond its inner end; seventh longitudinal a little arcuated at its tip.

Hab.—Sydney and Berowra, N.S.W. (Skuse). April and June; also taken in copulâ during September.

Obs.—Ten specimens for comparison. The second posterior cell varies in size, even in the wings of a single specimen; it is entirely absent in one wing of a female specimen before me. The position of the dots on the intermediate thoracic stripe differs from that of L. luteipennis, contempta and inornata, O.-Sack., where they are situated at the anterior extremity, close to the collare.

354. Limnophila Rostrifera, sp.n.

Q.—Length of antennæ	0.085 inch	 2·14 millimètres.
Expanse of wings	0.410×0.090	 10.41×2.27
Size of body	0.460×0.050	 11.67×1.27

Head narrowed posteriorly, greyish-brown; collare prolonged, greyish-brown; rostrum the length of the head, greyish-brown; palpi dark brown; antennæ brown, the first joint of scapus greyish-brown; flagellar joints fusiform. Thorax with a greyish bloom, opaque, with three broad brown stripes; intermediate stripe apparently double, with two small shining black dots at its anterior extremity; lateral ones extending beyond the suture, more or less coalescent with base of intermediate stripe; humeral pits prominent; pleuræ and metathorax more or less hoary. Halteres ochreous, with infuscated club. Abdomen brown, superior segments bordered laterally and posteriorly with

ochreous; venter ochreous, or ochreous-brown; ovipositor long, slender, slightly curved, ochreous or testaceous. Coxæ ochreous or brownish-ochreous, somewhat hoary. Femora testaceous, darkening into brown at the tips; tibiæ and tarsi brown. Wings pellucid, with a very slight brownish tint; the costal (except at base) and sub-costal cells, origin of præfurca, inner ends sub-marginal and all the posterior cells clouded with brown; also margins round apex of wing clouded with brown; stigma elongate, brown; veins brown. Auxiliary vein reaching first longitudinal vein opposite or somewhat before inner end of second sub-marginal cell, connected near the tip by cross-vein to costa; præfurca of moderate length, arcuated at base; petiole of first sub-marginal cell equal in length to posterior branch of second longitudinal vein; the latter arcuated at its base, the remainder a little bent; marginal cross-vein situated beyond the middle of petiole of first sub-marginal cell, and a distance equal to its length from tip of first longitudinal vein; inner end of second sub-marginal cell rounded, situated a little before that of first posterior cell; small cross-vein a little arcuated, in line with inner end of discal cell; the latter at least as long as third posterior cell; second posterior cell less than half the length of third posterior; great cross-vein situated a short distance beyond inner end of discal cell; seventh longitudinal vein arcuated at its tip.

Hab.—Sydney? (Masters). Three specimens.

Obs.—This species approaches O.-Sacken's L. luteipennis group by the structure of the head, prolongation of collare, double dots on anterior extremity of intermediate thoracic stripe, &c., but the second sub-marginal cell is shorter, the posterior branch of the second longitudinal vein is only a little arcuated, and the rostrum is as long as the head.

355. Limnophila imitatrix, sp.n. (Pl. XXII. fig. 22).

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Q.—Length of antennæ..... 0.060 inch ... 1.54 millimètres. Expanse of wings..... 0.410 \times 0.090 ... 10.41 \times 2.27 Size of body...... 0.400 \times 0.040 ... 10.16 \times 1.01
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Head with a grey or yellowish-grey bloom; rostrum, palpi and antennæ black or dark brown; flagellar joints elliptical with very short verticils. Thorax covered with a grey or yellowish-grey bloom, traversed by three brown stripes; intermediate stripe terminating immediately before the suture; lateral ones shorter, narrow, reaching beyond suture; humeral pits black, shining; pleuræ, scutellum and metathorax blackish-brown with a greyish Halteres fulvous-yellow. Abdomen uniformly blackishbrown, clothed with short light hairs; & forceps of ordinary type, concolorous with abdomen; Q ovipositor long, almost straight, reddish-brown. Coxe and base of femora fulvous; remainder of joints usually uniformly dusky or blackish-brown, sometimes darker at the tips. Wings pellucid with a very pale brown tint, yellowish at the base; costal cell and inner ends of sub-marginal, discal and posterior cells, origin of præfurca, great-cross vein and tips of all the veins more or less distinctly clouded with brownish; veins dark brown; stigma pale. Auxiliary vein reaching first longitudinal vein opposite inner end of first sub-marginal cell, connected a short distance from its tip by a cross-vein to costa; præfurca moderately long, arcuated at base or angulated (sometimes with a short stump of a vein), otherwise straight; petiole of first submarginal cell very short, only about length of marginal cross-vein; inner end of first sub-marginal cell somewhat rounded; marginal cross-vein very pale and difficult to distinguish, cutting the middle of stigma, and situated scarcely nearer to tip of first longitudinal vein than to inner end of first sub-marginal cell; inner end of second sub-marginal cell rectangular; first posterior cell as long or very slightly longer than second sub-marginal; small crossvein curved; discal cell usually a little wider at its distal end, its inner end somewhat before that of first posterior cell; second posterior cell half the length of third; great cross-vein at

middle of discal cell; seventh longitudinal vein a little arcuated at the tip.

Hab.—Mount Kosciusko, N.S.W., 5-6000 ft. (Helms). March; nine specimens in Coll. Australian Museum.

· Obs.—Very like L. rostrifera in size, colour of legs, and veincloudings but in all other respects a very different insect.

356. LIMNOPHILA ANTIQUA, sp.n. (Pl. XXII., fig. 23).

- \mathcal{J} .—Length of antennæ....0.140 inch3.55 millimètres.Expanse of wings.... 0.380×0.090 ... 9.64×2.27 Size of body..... 0.320×0.040 ... 8.12×1.01
- Q.—Length of antennæ.... 0.130 inch ... 3.30 millimètres. Expanse of wings.... 0.400×0.090 ... 10.16×2.27 Size of body.... 0.380×0.040 . 9.64×1.01

Head more or less slaty-grey, tinged with ochreous; rostrum and palpi black; antennæ ochreous, the two basal joints sometimes brown or brownish (in one specimen blackish); flagellar joints long, cylindrical, ringed with brown at the base, densely and uniformly covered with short hairs interspersed with some longish bristles. Thorax very gibbose, projecting over the head, ochreous or greyish-ochreous (sometimes light brownish), opaque, with a prominent brown band round mesonotum, across pleuræ, to base of abdomen; two longitudinal rows of brown hairs; prosternum with a narrow longitudinal brown stripe; metanotum long. Halteres very long and slender, ochreous, the club more or less infuscated. Abdomen ochreous-brown or brownish; ? forceps brown or brownish, terminating with two beak-like movable appendages, densely covered with minute hairs, the outer one slightly hooked at the tip (pl. XXIV., fig. 63); Q ovipositor slightly curved, tinged with reddish-brown. Legs yellow, or brownishyellow. Wings with a pale brownish tint, entirely covered with numerous brownish dots or small spots in all the cells; a

somewhat, though not conspicuously, larger spot at the tip of most of the veins and at origin of præfurca; and a still larger, prominent, more or less wedge-shaped marking, based on the costa at tip of auxiliary vein and terminating at small cross-vein; veins brown or brownish; stigma elongate, pale. Auxiliary vein joining costa or first longitudinal* vein a short distance beyond inner end of first sub-marginal cell; sub-costal cross-vein near its tip; præfurca moderately long, arcuated, or even angulated, at its origin; petiole of first sub-marginal cell short, about equal in length to great cross-vein; branches of second longitudinal vein and the third longitudinal arcuated downwards; second submarginal and first posterior cells equal in length; small crossvein somewhat arcuated; marginal cross-vein usually pale, situated a short distance from tip of first longitudinal vein; second posterior cell about two-thirds the length of third posterior; discal cell somewhat wider at its distal end, not long, its inner end situated a little before that of first posterior cell; great cross-vein at the middle or nearer the distal end; all the veins terminating on posterior margin slightly arcuated at the tip; seventh longitudinal vein distinctly arcuated at its tip.

Hab.—Sydney and Blue Mountains, N.S.W. (Masters and Skuse). Six specimens. October.

Obs.—This and the following species, L. interventa, are closely allied, and I have also a damaged specimen of another undescribed species with marbled wings which is nearly related. L. antiqua and interventa agree in the structure and markings of the antennæ, head and thorax, etc., differing principally in the venation and markings of the wings. In L. interventa the veins only are spotted.

357. LIMNOPHILA INTERVENTA, sp.n. (Pl. XXII., fig. 24).

Q.—Length of antennæ..... 0.140 inch ... 3.55 millimètres. Expanse of wings. 0.450×0.095 ... 11.42×2.39 Size of body.... 0.400×0.040 ... 10.16×1.01

^{*} It is impossible to decide which is the tip of the auxiliary vein and which the sub-costal cross-vein.

Structure and colouring of antennæ, thorax, and halteres entirely resembling L. antiqua; except that the thoracic brown band is obliterate on the mesonotum; and the abdomen ochreous, mottled with brownish. Wings pellucid, with a very pale brownish or yellowish tint; veins brownish, the costal, auxiliary and first longitudinal veins ochreous; the bases and tips of all veins, each end of the cross-veins, and inner ends of cells, with a very small brownish spot, imparting an indistinctly spotted appearance to the wings; præfurca clouded for a short distance at its origin; veins and stigma pale. Auxiliary vein reaching costa some distance beyond the inner end of first sub-marginal cell; subcostal cross-vein situated near its tip; præfurca rather shorter than in L. antiqua (consequently the cells at apex of wing longer) obtusely angulated at its origin; petiole of first sub-marginal cell half the length of præfurca; branches of second longitudinal vein and the third longitudinal vein arcuated and running parallel as in L. antiqua; marginal cross-vein distinct, situated considerably before the tip of first longitudinal vein; inner end of second sub-marginal cell a short distance before that of first posterior cell and opposite that of discal cell; small crossvein short, straight; second posterior cell about two-thirds the length of third posterior cell; discal cell elongate, twice the length of that of L. antiqua, the cross-vein closing its distal end being almost opposite the tip of fifth longitudinal vein; inner end of third posterior cell nearly opposite the middle of discal cell; great cross-vein opposite middle of discal cell; all the veins terminating in posterior margin a little arcuated at the tip.

Hab.—Northern Queensland (?). A single specimen.

358. LIMNOPHILA INORDINATA, sp.n. (Pl. XXII., fig. 25).

 \mathcal{J} .—Length of antennæ.....0.045 inch1.13 millimètres.Expanse of wings...... 0.350×0.080 8.87×2.02 Size of body...... 0.250×0.035 6.34×0.88

Head greyish-brown; rostrum, palpi, and antennæ brown; flagellar joints elliptical, with very short verticils. Thorax

covered with a yellowish-grey bloom, with three brown stripes; intermediate stripe broad, terminating at suture; lateral ones narrow, stopping at a brown spot opposite origin of wings; pleuræ brown. Halteres pale. Abdomen blackish-brown; forceps (apparently) of ordinary type, concolorous with rest of body. Legs brown, the tips of femora and tibiæ infuscated. Wings with a somewhat greyish tint; veins brownish, the bases and tips of veins, the cross-veins, and inner ends of cells very indistinctly infuscated; stigma very faintly infuscated. Auxiliary vein joining first longitudinal vein a little beyond inner end of second sub-marginal cell, joined to costa by a cross-vein exactly opposite the inner of that cell; præfurca moderately long, angulated near its origin, with a short stump of a vein; petiole of first sub-marginal cell less than one-fourth the length of præfurca; inner end of first sub-marginal cell rather acute, somewhat obliterate; marginal cross-vein very indistinct, cutting middle of stigma, and situated midway between inner end of first submarginal cell and tip of first longitudinal vein; second sub-marginal and first posterior cells of about equal length; small cross-vein curved; second posterior cell half the length of third; the latter shorter than fourth posterior cell;* discal cell elongate, the great cross-vein opposite the middle of its length; fifth and seventh longitudinal veins a little arcuated at the tip.

Hab.—Waterloo Swamps, near Sydney (Skuse). One specimen in June.

Obs.—There are some rather weak pieces of adventitious vein in the wings; in one wing a long curved piece originates from the fourth longitudinal vein opposite middle of præfurca; in both, an irregular very oblique piece forms a cross-vein across the middle of second basal cell; also in one wing there is a small stump of a vein near the tip of the seventh longitudinal vein.

^{*} The posterior branch of fourth longitudinal vein being forked.

II. FOUR POSTERIOR CELLS.

359. LIMNOPHILA METALLICA, Schiner.

Limnophila metallica, Schiner, "Novara" Exp. Dipt. p. 41, 1868.

Chalybeous blue. Head deep black, covered with black pubescence, the anterior portion of the front distinctly gibbose; rostrum, palpi and antennæ blackish or dark brown; rostrum short; palpi prominent; antennæ setaceous (portion lost), rather densely clothed with semi-decumbent hairs; first basal joint rather short and cylindrical, the second small, globose, not half the length of first; flagellar joints sessile, the first flagellar joint longer and thicker than the following ones, sub-spatulate. Collare black, inconspicuous. Thorax not such a brilliant metallic blue as the abdomen, but more blackish; pleuræ and pectus sooty-black or dark brown. Halteres blackish or dark brown. Abdomen clothed with minute blackish hairs; forceps short, black. Legs blackish, or deep brown. Wings entirely infuscated with a blackish or brown tint; veins dark; stigma imperceptible. Auxiliary vein terminating a little beyond inner end of second sub-marginal cell; subcostal cross-vein at its tip; præfurca nearly straight, originating before the middle of the wing; petiole of first sub-marginal cell half the length of upper branch of second longitudinal vein; marginal cross-vein situated nearer inner end of first sub-marginal cell than to tip of first longitudinal; second sub-marginal cell longer than the first posterior; small cross-vein straight; discal cell a little longer than broad, the great cross-vein somewhat beyond its inner end; ultimate section of fifth longitudinal vein only equal to length of great cross vein, being abruptly turned to posterior margin.

Hab.—Sydney (Masters). One specimen.

Obs.—This species is remarkable for its metallic blue colour, dark wings, and broad, closely applied head. The antennæ it seems would scarcely reach the origin of the wings, the first seven joints measuring only 1.66 mm. There does not appear to be anything peculiar about the ♂ forceps, which are, however, difficult to examine in a dried specimen.

360. LIMNOPHILA LUCTUOSA, sp.n. (Pl. XXII., fig. 26).

Q.—Length of antennæ.... 0.035 inch ... 0.88 millimètre. Expanse of wings.... 0.250×0.060 ... 6.34×1.54 Size of body.... 0.250×0.030 ... 6.34×0.76

Head covered with a yellowish-grey bloom (shining black when rubbed); rostrum, palpi, and antennæ black; flagellar joints globose to elliptical, with very short, sparse verticils. Thorax covered with a yellowish-grey bloom, with three brownish stripes; the intermediate one disappearing before reaching the suture; lateral ones very short, reaching suture; pleuræ, scutellum, and metanotum with a hoary bloom (the ground colour deep brown). Halteres yellow. Abdomen brown, sparingly clothed with short yellowish hairs; ovipositor brownish-ochreous or fulvous. Coxæ and femora fulvous, the latter brown at the tip; tibiæ brownish, infuscated at the tip; tarsi infuscated. Wings with a scarcely perceptible brownish tint; veins brownish; stigma brownishgrey. Auxiliary vein reaching costa opposite or before inner end of second sub-marginal cell; sub-costal cross-vein a little before its tip; præfurca rather short, arcuated at its origin; petiole of first sub-marginal cell one-third to half the length of præfurca, and about half the length of anterior branch of second longitudinal vein; marginal cross-vein cutting stigma, and situated beyond inner end of first sub-marginal cell a distance about equal to its length, and more than twice that from tip of first longitudinal vein; inner ends of second sub-marginal and first posterior cells in one line; small cross-vein a little arcuated; discal cell elongated, the great cross-vein more or less beyond its inner end.

Hab.—Gosford, N.S.W., and Middle Harbour, Sydney (Skuse); Mount Kosciusko, N.S.W., 5000 ft. (Helms), one specimen in Coll. Australian Museum.

Obs.—I have taken only two specimens of this species.

361. LIMNOPHILA LEVIDENSIS, sp.n. (Pl. XXII., fig. 27).

 \mathcal{J} .—Length of antennæ.....0.030 inch...0.76 millimètre.Expanse of wings...... 0.220×0.045 ... 5.58×1.13 Size of body 0.180×0.025 ... 4.56×0.62

Q.—Length of antennæ.... 0.035 inch ... 0.88 millimètre. Expanse of wings.... 0.250×0.060 ... 6.34×1.54 Size of body.... 0.190×0.030 ... 4.81×0.76

Head black, with a grey bloom; rostrum, palpi and antennæ black; basal joints of latter brown; flagellar joints sub-cylindrical, with very short verticils. Thorax greyish-ochreous or light brownish, mesonotum brownish in the Q, levigate; transverse suture brown in the middle. Halteres pale, the club infuscated. Abdomen olive-brown, the venter paler; genitalia ochreous; 3 forceps of ordinary type, terminal appendages black; Q ovipositor long, slender, slightly arcuated. Coxe ochreous or pale brownish. Femora deep olive-brown; tibiæ and tarsi black. Wings with a greyishtint; veinsdark; stigmagreyish. Auxiliary vein terminating opposite or a little before inner end of second sub-marginal cell; sub-costal cross-vein considerably before its tip, that is, a distance at least equal to great cross-vein; præfurca tolerably long, nearly straight; first sub-marginal cell as long as præfurca, with a short petiole; marginal cross-vein indistinct, cutting stigma much nearer tip of first longitudinal vein than to inner end of first sub-marginal cell; inner ends of second sub-marginal and first posterior cells in one line; small cross-vein scarcely arcuated; discal cell elongated, the great cross-vein situated considerably beyond its inner end; fifth, sixth and seventh longitudinal veins more or less arcuated towards the tip.

Hab.—Mossman's Bay, near Sydney (Skuse). A pair in copula in August.

Obs.—Readily distinguished from L. luctuosa by the lighter thorax destitute of stripes, dark legs, greyish-tinted wings, dark veins, and length of præfurca and first sub-marginal cell.

362. LIMNOPHILA LAWSONENSIS, sp.n. (Pl. XXII., fig. 28).

3	-Length of antennæ	0.640 inch		16.25 millimètres.
	Expanse of wings	0.260×0.065		6.62×1.66
	Size of body	0.210×0.035	•••	5.33×0.88

Q.—Length of antennæ..... 0.080 inch ... 2.02 millimètres. Expanse of wings...... 0.270×0.065 ... 6.85×1.66 Size of body....... 0.270×0.035 ... 6.85×0.88

Head brown, with a somewhat yellowish-grey bloom; rostrum, palpi and antennæ brown; & antennæ more than three times the length of entire body, setaceous, densely clothed with very short almost erect pubescence; the incisions between the first few flagellar joints yellowish, the rest not distinguishable; Q antennæ short, exactly reaching origin of wings if bent back; the second basal joint reddish-fulvous, and the first seven or eight flagellar joints reddish-yellowish at the tip; first flagellar joint one-third longer and distinctly thicker than the second; remaining joints gradually decreasing in length, those towards the tip sub-elliptical. Thorax brown, levigate, marked with several short stripes of greyish or yellowish-grey bloom; pleuræ slightly hoary; scutellar pits distinct, blackish. Halteres ochreous-yellow, the stem very slightly infuscated. Abdomen brown, clothed with yellowish hairs; genitalia reddish-testaceous; & forceps with two pairs of short movable appendages; the outer one sub-clavate, serrate on the outside towards and at the tip; inner one arcuate (Pl. xxiv., fig. 64); Q ovipositor long, almost straight. Coxæ, femora and tibiæ testaceous to brownish-ochreous; the femora with a broad ring of black near the tip, preceded and followed (at the tip) by a narrow ring of golden-yellow; tibiæ infuscated at the base and tip (the extreme base golden-yellow); tarsi brown or brownish, the metatarsal joints more or less testaceous. Wings sub-hyaline, spotted with brown, more completely so in Q than 3; basal cells in Q almost entirely clouded; in 3 only at the ends and two roundish spots, one at præfurca, the other larger, beneath, in second basal cell; an oblong spot in anal cell filling space before the middle; similar clouds on margin in anal angle, and mid-way between the tips of sixth and seventh longitudinal veins; the remaining clouds more or less round, situated close to the tips of all the veins, and on the cross-veins, those on the latter confluent (Pl. XXII., fig. 28, Q wing); veins brown; stigma not noticeable. Auxiliary vein reaching costa some distance before inner end of second sub-marginal cell; sub-costal cross-vein a little before its tip; præfurca of moderate length, arcuated close to its base; petiole of first sub-marginal cell about (more or less) twice the length of anterior branch of second longitudinal vein; the latter branch obliquely situated, very slightly sinuose, joining costa a little beyond the tip of first longitudinal vein; posterior branch of second longitudinal vein slightly arouated anteriorly, rather longer than petiole of first sub-marginal cell; marginal cross-vein wanting; inner end of second sub-marginal cell situated considerably before that of first posterior cell; small cross-vein short; third posterior cell considerably longer than the second posterior; discal cell elongate, the great cross-vein situated at its inner end; fifth, sixth and seventh veins arcuated at the tip, the seventh the most noticeably.

Hab.—Lawson, Blue Mountains, N.S.W. (Masters). Two specimens in January.

Obs. 1.—A Q specimen obtained by Mr. A. G. Hamilton at Mount Kembla, Illawarra District, appears to belong to this species; it is however considerably damaged. The anterior branch of second longitudinal vein differs in being almost vertical, joining the costa

immediately beyond the tip of the first longitudinal vein, and looking like a cross-vein.

Obs. 2.—This and the following species, L. australasiæ, form a natural group, and might be considered at least a distinct subgenus. The antennæ are long in the male, short in the female; in L. Lawsonensis the male antennæ being more than three times the length of the entire body. The head is broad; collare inconspicuous. Male forceps (Pl. xxiv. fig. 64) with a serrate, clavate, outer appendage, and an inner arcuated one. Femora ringed before the apex. Wings numerously spotted with brown. Auxiliary vein stopping considerably before the inner end of the second sub-marginal cell; marginal cross-vein entirely wanting; first sub-marginal cell short, with a long petiole; the anterior branch of the second longitudinal vein joining the costa not far beyond the tip of the first longitudinal vein; second sub-marginal cell longer than first posterior; third posterior cell longer than second; great cross-vein usually at inner end of discal cell.

363. LIMNOPHILA AUSTRALASIÆ, sp.n. (Pl. XXIII. fig. 29).

- Q.—Length of antennæ..... 0.070 inch ... 1.77 millimètres. Expanse of wings...... 0.290×0.090 ... 7.35×2.27 Size of body....., 0.250×0.035 ... 6.34×0.88

Head brown, with a yellowish-grey bloom; rostrum, palpi and antennæ brown, the first few joints of latter usually more or less testaceous; 3 antennæ not quite the length of entire body, setaceous, densely clothed with tolerably long, almost erect pubescence; flagellar joints gradually decreasing in length, the incisions between the first seven or eight ochreous; Q antennæ short, scarcely reaching origin of wings if bent back; flagellar joints sub-elliptical,

the first cylindrical, about the length of second and third taken together. Thorax covered with yellowish-grey bloom, with brown stripes and spots*; two more or less distinct, somewhat irregular, intermediate stripes terminating at transverse suture; two lateral ones from below humeri to above origin of wings; a roundish spot on each side at the back of mesothorax; a deep brown stripe on lateral border from collare to origin of wings; pleuræ covered with a greyish or yellowish-grey bloom, with a short brown stripe midway between origin of wings and fore coxæ; scutellum and metathorax more or less covered with greyish bloom, the scutellar pits distinct, brown. Halteres ochreous-yellow, the club usually slightly infuscated. Abdomen brown; the posterior margins of segments and venter more or less ochreous; genitalia reddishtestaceous, similar in structure to L. Lawsonensis. Legs ochreous or dull testaceous; the joints ringed as in L. Lawsonensis. Wings sub-hyaline, in both sexes spotted exactly as in the 3 of L. Lawsonensis; venation very similar to that of last species, except that the anterior branch of second longitudinal vein in all cases joins the costa beyond the tip of first longitudinal vein a distance at least equal to its length.

Hab.—Woronora, and Knapsack Gully, Blue Mountains, N.S.W., 5 ♂, 7 ♀ specimens (Masters and Skuse); King George's Sound, Western Australia (Masters), two ♀ specimens in Coll. Australian Museum.

Obs.—Easily distinguished from L. Lawsonensis by the shorter male antennæ, which are less than the length of the body in this species.

364. LIMNOPHILA VICARIA, Walker.

Limnobia vicaria, Walk., Ent. Mag. II. p. 469, 1835.

Like Lim. geniculata (Meigen, Syst. Beschr. II. pl. 2, fig. 15, wing).

^{*} The pattern in the thorax seems only a modification of that in L. Lawsonensis.

"Q.—Fusca, obscura; caput fulvo-fuscum, angustum; oculi obscurè fusci; antennæ fuscæ, capite paullò longiores; thorax subtus et posticè fulvus; abdomen obscurè fuscum, longum, gracile; femora ferè omnia tibiæ que basi et apice pallidè fusca; tarsi apice et ungues nigri; alæ subhyalinæ, iridescentes; costa fusca, basi pallidior, maculis plurimis subhyalinis; subcostam maculæ 4 majores sub fuscæ; squamulæ et nervi fusca; nervi omnes longitudinales punctis fuscis ornati; nervulus transversus discoidalis fusco limbatus; halteres pallidè fulvi, apice fusci." Corp. long. 7 lin.; alar. 10 lin.

Hab. - New Holland.

365. LIMNOPHILA BASALIS, Walker.

Limnobia basalis, Walk., Ins. Saund, Dipt. p. 434, 1856.

(Div. E. Meig, Syst. Beschr. II. p. 125, pl. 6, fig. 2).

"Nigra, nitens; alæ nigricantes, venis nigris."

"Q.—Black, shining. Oviduct short, nearly cylindrical. Wings blackish; veins and halteres black. Length of the body 5 lines; of the wings 10 lines."

Hab.—Van Diemen's Land.

Genus 23. Gynoplistia, Westwood.

Gynoplistia, Westw., Lond. and Edinb. Phil. Mag. VI. p. 280, 1835; Gynoplistes [nec Anoplistes] Westw., Zool. Journ., V., p. 447 (No. 20, 1835); Gynoplistia, Macquart, S. à B. II. Suppl. p. 649, 1835; Dipt. Exot. I. p. 43, 1838; Variegata, Bigot, Ann. Soc. Ent. Fr. 1854, p. 456; Cloniophora, Schiner, Wien. Ent. Monatschr. 1866; "Novara" Exp. Dipt. p. 40, 1868; Canarthria, Thomson, "Eugenia" Exp. Dipt. p. 445, pl. ix. f. 1, 1868; Gynoplistia, O.-Sack., Mon. Dipt. N. Amer. IV. App. II. p. 331, 1869; Westw., Trans. Ent. Soc. Lond. 1881, p. 369. pl. xviii. figs. 5-6-7; O.-Sack., Studies, II. p. 210, 1887.

Two sub-marginal cells; five (rarely only four*) posterior cells; discal cell closed; auxiliary vein reaching costa more or less opposite inner end of second sub-marginal cell; sub-costal cross-vein near its tip; first longitudinal vein reaching costa about opposite middle of anterior branch of second longitudinal vein; first sub-marginal cell with a short petiole; seventh longitudinal vein distinctly sinuated. Wings glabrous. Eyes glabrous. Antennæ 16- to 20-jointed, usually most of the flagellar joints unipectinate in both sexes. Tibiæ spurred; empodia distinct; ungues smooth. The forceps of the male Limnophila-like; usually with only one horny claw-shaped appendage.

Rostrum short, with large suctorial labella. Head wider than long; eyes round, slightly emarginate at base of antennæ; front broad; palpi tolerably long, joints about equal or the first shortest. The antennæ usually short, shorter in Q than in &, seldom reaching beyond the root of the wings if bent backwards, reaching beyond only in G. vilis (3); the number of joints varies from 16 to 20 in both sexes, the number being somewhat variable in individuals of the same species; in 3 the first 10 to 15, and in Q the first 8 to 12, flagellar joints unipectinate, the branches shorter in Q than in & (in G. jucunda, O.-Sack., from Celebes, only the first 6 flagellar joints are branched in both sexes); the branches are on the inner side of the antennæ, except the two first which are directed outwards, only in G. vilis are the three first directed outwards. Baron Osten-Sacken (Studies II. p. 210), says "the three first branches in all the species are inserted sideways, and hence are pointing in a direction different from that of the others," but I find that the third branch, in all but G. vilis, is inserted scarcely more sideways than the following ones; in the last-named species, the fourth branch is situated similarly to the third in the remaining species. Macquart's figures of the antennæ of G. vilis (Dipt. Exot. 4th Suppl. pl. i. fig. 2) and of G. bella (variegata, Macq.) correctly show the difference between them. The terminal joints of the

^{*} Only four posterior cells in *Gyn. jucunda*, O.-Sack., from Celebes (Ann. del Mus. Civ. di St. Nat. di Gen. XVI. 1881, p. 405).

flagellum are subject to slight modifications; the last two, three or four branches on the flagellum diminish in length, the last one or two sometimes a mere tooth or very rudimentary; the terminal simple joints vary from 2 to 7, generally more in the Q than in the 3, the last of all is usually cylindrical and longer than the rest. Westwood's division of the species into two sections based upon the number of branched flagellar joints is useless, and was evidently the result of the examination of a very limited number of specimens. His first section contains two species, G. vilis and cyanea, the 3 antennæ of which have the first 15 flagellar joints branched, in the second section the first 12 only. But some species of G. vilis have only the first 14, whilst some of G. bella have the first 15 branched. However the 3 antennæ of G. vilis (possibly also of G. cyanea) certainly differ from those of all others in the direction of the first three branches; the & forceps also exhibits a considerable difference.

The thorax is large; collare moderately devoloped. tolerably strong, more particularly the hind pair; tibiæ spurred; empodia distinct; ungues smooth. Abdomen broader in Q than the &; the last two or three segments in & usually somewhat broader than the preceding, the forceps usually narrowed; the abdomen in 3 of G. vilis and G. flavipennis is comparatively longer and more cylindrical than in the other species; the second to fifth or sixth segments are narrowed in G. melanopyga and G. bimaculata; base of abdomen only slightly narrower in G. bella and G. viridis. The male forceps (Pl. XXIV., figs. 65-70) consists of a pair of short, fleshy, basal pieces armed usually with a single claw-shaped horny appendage; in G. melanopyga this appendage differs from the others in being more blunt and tridentate at the extremity; whilst the forceps of G. vilis departs considerably from the common type in being armed with three claw-shaped appendages, one of which is a fixture and another minutely bidentate at the end The visible appendages of the internal apparatus are variable. I have seen what I take to be the membranous opercule mentioned by Macquart (Dipt. Exot. I. p. 43) in only one species,

G. bella; it is also present in G. annulata, according to Baron Osten-Sacken. The Q ovipositor is broad at the base, the upper valves long, curved, and the lower ones shorter and straight.

The venation is not subject to very great variation. auxiliary vein joins the costa more or less opposite the inner end of the second sub-marginal cell, rarely opposite that of first submarginal; the sub-costal cross-vein is close by its tip. The first longitudinal vein joins the costa usually a little beyond the middle of the anterior branch of second longitudinal vein; the marginal cross-vein situated about its length distant from the tip of the first longitudinal vein is usually opposite the middle of the anterior branch of the second. The præfurca is moderately long, more or less arcuated at its base. Second sub-marginal cell slightly longer than the first, the petiole of the latter more or less the length of marginal cross-vein; the anterior branch of second longitudinal vein arcuated at its base, then curved gently upwards, and about twice the length of posterior branch which is gently curved downwards. Inner ends of second sub-marginal and discal cells usually opposite one another; the small cross-vein a short distance beyond; in G. flavipennis the small cross-vein is extremely small or entirely obsolete so that the inner ends of the second sub-marginal and discal cells form almost a right angle with one another. There are five posterior cells in all but one species, G. jucunda, O.-Sacken. The second posterior cell in the former case, varies from one-half to two-thirds the length of the third posterior; the third and fourth posterior cells of equal length or the latter somewhat longer. Discal cell closed, usually not more than twice longer than broad; the great cross-vein usually about opposite its middle, but near its inner end in G. flavipennis. Sixth longitudinal vein slightly and seventh distinctly sinuated. The wings (Pl. XXIII., figs. 30-42) more or less completely banded transversely with brown; except for stigma they are immaculate in G. flavipennis.

Schiner's Cloniophora and Thomson's Cænarthria are Gynoplistiæ; the difference in the antennæ being only of specific importance. The species which seem to differ most from the rest are G. vilis, Walk., and the extra-Australian G. jucunda, O.-Sack.

The Gynoplistice frequent flowers; their young stages are unknown.

366. Gynoplistia vilis, Walker. (Pl. XXIII., fig. 30).

Ctenophora vilis, Walk., Ent. Mag. II. p. 469, 1835; Gynoplistia vilis, Westwood, Lond. and Edin. Phil. Mag. VI. p. 280, 1835; G. nervosa, Westw., Zool. Journ. V. No. 20, p. 447, pl. xxii. figs. 10-11; G. flavitarsis. Macquart, Dipt. Exot. 4th Suppl. p. 12, t. 1, fig. 2, 1850; G. vilis, Westw., Trans. Ent. Soc. 1881, p. 369, pl. xviii. f. 6.

Head with a greyish or yellowish-grey bloom; rostrum, palpi and antennæ black or deep brown, the first joint of palpi and first five (sometimes only the two basal) joints of antennæ testaceous; the antennæ 18- or 19-jointed in both sexes; in 3 the first 14 or 15 flagellar joints rather elongate with a long branch, last two or three branches becoming shorter; the remaining two or three joints sub-cylindrical; in Q the first 11 or 12 flagellar joints with very short sub-equal branches, the last two or three branches usually very short, terminal joint elongate, cylindrical; in both sexes the first three branches directed outwards. Thorax with a greyish or yellowish-grey bloom (the ground-colour deep brown or black), with more or less distinct traces of three brown or brownish longitudinal stripes meeting in front of suture; a lateral brown stripe from anterior margin to origin of wings; pleuræ with a grey bloom. Halteres ochreous-yellow with infuscated club. Abdomen brown, sometimes deep brown; the second to fourth segments more or less deeply bordered anteriorly, and all the segments slightly laterally, with ochreous; sometimes the fifth segment, or even also the third and fourth, entirely ochreous or brownish-ochreous; venter brownish-ochreous or brownish, sometimes the last segment entirely dark brown; 3 forceps ochreousbrown or light brown, armed with two outer movable, and one inner fixed, claw-like appendages (Pl. xxiv., fig. 65); ovipositor ochreous-brown, more or less reddish, upper valves elongated, slightly curved, lower valves shorter. Coxæ fulvous or light brown, covered with a grey bloom. Femora somewhat obscure fulvous or testaceous, with a broad black ring at apex; genua pale; tibiæ obscure fulvous or testaceous at basal half, gradually darkening into black towards apex; tarsi black, in the hind feet the metatarsal joints ochreous-yellow, with a black ring at the apex.* Wings with a brownish tint, with two dark brown spots; first spot small, squarish, at origin of second longitudinal vein, the second running obliquely from costa (at stigma, which it envelopes) to small crossvein or the inner end of discal cell; veins dark brown. Auxiliary vein reaching costa opposite or beyond inner end of second submarginal cell; sub-costal cross-vein a little before its tip, obliquely situated; marginal cross-vein indistinct (owing to stigma) situated a distance equal to twice its length from tip of first longitudinal; tip of first longitudinal vein opposite middle of anterior branch of second longitudinal; præfurca a little arcuated at its base, straight, tolerably long; petiole of first sub-marginal cell short, about half the length of stigma; anterior branch of second longitudinal almost straight, reaching costa nearly mid-way between tip of first longitudinal and that of posterior branch of second longitudinal; the latter branch slightly arcuated posteriorly towards its tip; second posterior cell two-thirds the length of third posterior; discal cell longer than wide, the great cross-vein at or rather beyond its middle; seventh longitudinal vein sinuated.

Hab.—Tasmania (Macquart); Sydney and other localities in N.S.W. (Masters and Skuse). Three δ and three Q specimens.

^{*} Macquart says "les deux premiers articles des postérieurs d'un jaune pâle."

367. GYNOPLISTIA CYANEA, Westwood. (Pl. XXIII., fig. 31).

Gynoplistia cyanea, Westw., Lond. and Edin. Phil. Mag. VI. p. 280, 1835; Macquart, S. à B. II. Suppl. p. 649; Westw., Trans. Ent. Soc. III. p. 370, 1881.

Q.—Length of antennæ..... 0.125 inch ... 3.16 millimètres. Expanse of wings...... 0.430×0.120 ... 10.92×3.04 Size of body...... 0.500×0.075 .. 12.70×1.89

Head black, with a reflection which is almost imperceptibly bluish. Rostrum, palpi and antennæ brown; the latter 2-+17jointed; flagellar joints 1-8 with a short obtuse branch, the branches gradually diminishing in length, that on the eighth flagellar joint very short; the next joint with a very small projection on inner side; remaining eight joints elliptical, gradually becoming narrower. Collare dark brown. Thorax black, somewhat shining; pleuræ and coxæ pruinose; scutellum and metanotum dark brown, nearly black. Halteres brown, stem lighter. Abdomen deep violaceous, the first two or three segments with a brownish tinge, shining; ovipositor brown. Trochanters, femora and tibiæ obscure testaceous-brown, fuscous at the apex; tarsi fuscous. Wings with a brownish tint, and all the veins clouded; tinted with testaceous-brown between first longitudinal vein and costa (except at extreme base); and having two fuscous sub-costal spots; a small one at base of second longitudinal vein, and a larger one from inner end of stigma to inner end of discal cell; veins and stigma fuscous. Auxiliary vein reaching costa slightly before inner end of second sub-marginal cell; sub-costal cross-vein situated immediately before tip; marginal cross-vein scarcely discernible, situated a little before tip of first longitudinal vein; petiole of first sub-marginal cell extremely short; posterior branch of second longitudinal vein arcuated upwards at the tip; second posterior cell 2 the length of third posterior cell; small cross-vein less than half the length of basal portion of third longitudinal vein; great cross-vein situated immediately before middle of discal cell.

Hab.—New Holland (Westwood); Tasmania (Masters).

Obs.—I have no doubt that the above-described is the Q of G. cyanea, Westw. Westwood states that this species appears to be very closely allied to Limnophila metallica, Sch., but the latter is a very different insect as can be seen both from Dr. Schiner's and my description. It would be interesting to know if the male has the three first branches of the flagellar joints directed outwards; Westwood places this species in the same section with G. vilis.

368. Gynoplistia obscurivena, sp.n. (Pl. XXIII., fig. 32).

Q.—Length of antennæ..... 0.090 inch ... $2 \cdot 27$ millimètres. Expanse of wings...... 0.380×0.100 ... 9.64×2.54 Size of body........ 0.460×0.060 ... 11.70×1.54

Head black, somewhat shining, densely clothed with black hairs; rostrum, palpi, and antennæ black, the latter 19-jointed; first 9 flagellar joints with a short branch, the first and last one or two shorter; tenth flagellar joint sometimes with a slight projection on inner side; remaining seven joints sub-elliptical, the terminal one more elongate. Collare dark brown. Thorax black, shining; pleuræ and coxæ with a greyish bloom. Halteres brown or black. Abdomen shining violaceous, incisions of the first two or three segments sometimes tinged with, or even the second to fifth segments entirely reddish-fulvous; ovipositor entirely reddish-fulvous, the valves slender, slightly arcuated. Legs black, the femora reddish-fulvous, with a broad ring of black (more than \frac{1}{2} the length of femora) at apex. Wings yellowish at base, with three brownish spots, the apex of wing and all the veins infuscated with paler brownish; first spot filling basal ends of basal cells, the second oblong, enveloping basal half of præfurca and not quite reaching posteriorly to fourth longitudinal, third cloud irregularly roundish, extending from costa (at stigma) to inner end of discal cell; costal cell brown; apex of wing clouded from inner end of second posterior cell; veins dark brown.

Auxiliary vein reaching costa opposite inner end of second submarginal cell; sub-costal cross-vein near its tip; marginal cross-vein rather indistinct, about its length distant from tip of first longitudinal vein; præfurca moderately long, arcuated at its origin; petiole of first sub-marginal cell very short; anterior branch of second longitudinal vein usually slightly sinuose, about half the length of posterior branch, reaching costa beyond tip of first longitudinal a distance about half the length of stigma; posterior branch arcuated slightly upwards at the extreme tip; second posterior cell more than half the length of third posterior; discal cell longer than wide, the great cross-vein opposite its middle; seventh longitudinal vein sinuated.

Hab.—New South Wales (Masters). Three specimens.

Obs.—Closely allied to G. cyanea, but easily distinguished by the wing-markings, etc.

369. Gynoplistia Bella, Walker. (Pl. XXIII., fig. 33).

Ctenophora bella, Walk., Ent. Mag. II., p. 470, 1835; Gynoplistia bella, Westwood, Lond. and Edin. Phil. Mag. VI. p. 280, 1835; G. variegata, Westw., Zool. Journ. V. No. 20, 448, pl. xxII., figs. 12, 13; Macquart, Dipt. Exot. I. p. 44, t. III. f. 1a, 1838; Suppl. I. p. 10, 1846, t. I. f. 5; Variegata gymnoplisticides, Bigot, Ann. Soc. Ent. Fr. 1884, p. 456. Gynoplistia elegans, Walk., Ins. Saund. I. Dipt. p. 447, 1856; G. variegata Schiner, "Novara" Exp. Dipt. 1868, p. 39; G. bella, Westw., Trans. Ent Soc. Lond. 1881, p. 370.

- \bigcirc .—Length of antennæ..... 0·120 inch ... 3·04 millimètres Expanse of wings...... 0·330 × 0·090 ... 8·37 × 2·27 Size of body 0·360 × 0·060 ... 9·14 × 1·54

Head black, somewhat shining, clothed with black hairs; rostrum, palpi, and antennæ black, the two basal joints of the latter sometimes fulvous; & antennæ 18- or 19-jointed, the first 13 or 14 flagellar joints* with long branches, decreasing in length from eighth or ninth joint, the fourteenth, when present, a mere tooth; last three or four joints elongate-elliptical, the terminal one usually elongate-cylindrical; Q 17- or 18-jointed, the first 9 or 10 flagellar joints with short branches, decreasing in length from sixth or seventh joint, the tenth, when present, very rudimentary; last five or six joints more or less elliptical, the terminal one usually elongate; in both sexes the first two branches directed outwards. Thorax deep black, slightly shining, with three longitudinal narrow stripes of greyish-yellow bloom or microscopic pubescence (visible only at a certain obliquity) from anterior border to transverse suture, also two large distinct sub-triangular yellow spots of similar character to stripes immediately below the humeri; pleuræ and coxæ with a grey, almost hoary, bloom. Halteres black. Abdomen reddish-fulvous, the first and last two or three segments deep black; genitalia reddish-fulvous; & forceps (Pl. xxiv., fig. 66) armed with a single, somewhat hooked, appendage; Q ovipositor rather long, slightly curved. Coxe and tarsi deep black; femora fulvous or reddish-fulvous, with a broad ring of black at the apex; tibiæ black, the basal half (except a ring of black at base), more or less fulvous or reddish-fulvous. Wings slightly tinted with yellowish, the basal portions more fulvous (but black at the origin), with three blackish (in fresh specimens) or dark brown equidistant, irregular fasciæ, and the costal cell and apex (from inner end of second posterior cell) clouded with a somewhat lighter blackish or brown, the posterior margin slightly clouded with greyish; the first fascia not nearer base of wing than humeral cross-vein, sometimes interrupted in the axillary cell and at posterior margin, connected to next fascia by a vitta filling the intervening portion of anal

^{*}Sometimes the fifteenth flagellar joint also has a very rudimentary tooth of a branch.

cell; second fascia of about equal width to first, from origin of second longitudinal to tip of seventh longitudinal, subject to more or less complete interruptions in both the basal cells and at posterior margin, and connected to third fascia by a vitta more or less completely filling upper half of intervening portion of second basal cell; third fascia a little broader than the others, extending from costa, at stigma, across discal cell, to lower extremity of great cross-vein; the centre of discal cell usually clear. Auxiliary vein reaching costa opposite or somewhat beyond inner end of second sub-marginal cell (sometimes opposite inner end of first sub-marginal); sub-costal cross-vein near its tip; marginal cross-vein indistinct, about twice its length distant from tip of first longitudinal and joining anterior branch of second longitudinal vein at the middle; præfurca nearly straight, moderately long, arcuated or even angulated at its origin; petiole of first sub-marginal cell very short, sometimes less than length of marginal cross-vein; anterior branch of second longitudinal vein considerably arcuated at its base, about half the length of posterior branch, reaching costa beyond tip of first longitudinal a distance equal to about half the length of stigma; posterior branch arcuated slightly upwards at the extreme tip; second posterior cell somewhat more than half the length of third posterior; discal cell longer than wide, the great cross-vein opposite its middle; sixth longitudinal vein slightly and seventh distinctly sinuated.

Hab.—Apparently generally distributed in Australia. Common.

 $Var. \beta$.—Two β specimens have the apex of wings only slightly infuscated; the forceps and last two abdominal segments black; and the tibiæ brown with the base and apical half black.

Hab.—Tasmania (Masters).

 $Var. \gamma$,—A Q specimen has only the first and last abdominal segments black, and black tibiæ.

Hab.—King George's Sound, Western Australia (Masters).

Var. δ.—A ♂ specimen has the forceps and next preceding segment black, and the hind tibiæ brown at base and apex.

Hab.—King George's Sound (Masters).

Obs.—I have found this species most abundant about Sydney from August to November. There are more than one hundred specimens before me for comparison.

370. Gynoplistia Westwoodi, sp.n. (Pl. XXIII. fig. 34).

Q.—Length of antennæ..... 0.135 inch ... 3.42 millimètres. Expanse of wings..... 0.520×0.140 ... 13.20×3.35 Size of body...... 0.500×0.090 ... 12.70×2.27

Head black, somewhat shining, with black hairs; rostrum, palpi, and antennæ black, the first basal joint of latter sometimes brownish; the antennæ 18- or 19-jointed, the first 10 or 11 flagellar joints with short branches, decreasing in length from seventh or eighth joint, the eleventh, when present, a mere tooth; first two branches directed outwards; last six joints more or less elliptical, the terminal one usually elongate. Thorax black, shining; pleuræ and coxæ with a greyish or greyish-yellow bloom, the latter covering a brownish-fulvous spot mid-way between origin of wings and collare. Halteres brownish, with a black club. Abdomen reddish-fulvous, the first segment and last three violaceous-black, also violaceous-black spots laterally on the third to fifth segments; ovipositor entirely reddish-fulvous, the valves long, slightly curved. Coxe and tarsi black; femora and tibiæ fulvous or reddish-fulvous, with a ring of black at the apex (that on the former the broader). Wings with a slightly yellowish tint, the basal portion fulvous, with three brown equidistant spots or abbreviate fasciæ, also the costal cell tinted with yellow or very pale brownish, and the apex of wing (from inner end of second posterior cell); fourth (except anterior branches) to seventh longitudinal vein, and both ends of discal cell and great cross-vein, more or less infuscated with brownish; generally distinct cloud-streaks about middle of sixth and seventh longitudinal veins; first wing-spot filling basal portions of the two basal cells, second squarish, filling portion of first basal cell at origin of second longitudinal, third the largest, irregularly rounded, extending from costa (at stigma) to inner end of discal cell. Auxiliary vein opposite or somewhat beyond inner end of second sub-marginal cell, sub-costal cross-vein near its tip; marginal cross-vein indistinct, about its length distant from tip of first longitudinal vein and opposite middle of anterior branch of second longitudinal vein; præfurca arcuated at the base, moderately long; petiole of first sub-marginal cell very short, rather longer than marginal cross-vein; anterior branch of second longitudinal vein arcuated at the base, somewhat sinuated, usually less than half the length of posterior branch, joining costa beyond tip of first longitudinal a distance about equal to length of great crossvein; posterior branch slightly arcuated upwards at extreme tip; second posterior cell more than half the length of third; discal cell longer than wide, the great cross-vein situated before its middle; sixth longitudinal vein slightly and seventh distinctly sinuated.

Hab.—New South Wales (Masters and Skuse). Five specimens.

Obs.—This species is undoubtedly distinct from G. bella, to which however it is nearly related. At first glance it can easily be distinguished from G. bella by its larger size, less distinctly marked wings, and fulvous tibiæ. The male is unknown to me.

371. Gynoplistia Howensis, sp.n. (Pl. XXIII. fig. 35).

Q.—Length of antennæ..... 0.090 inch ... 2.27 millimètres. Expanse of wings..... 0.350×0.090 ... 8.87×1.27 Size of body...... 0.400×0.050 ... 10.16×1.27

Head very deep metallic blue; rostrum, palpi and antennæ black, the base of rostrum and first two or three antennal joints testaceous-yellow; antennæ 16-jointed, the first 7 flagellar joints with short sub-equal branches, the following two with rudimentary ones; first two branches directed outwards; last five

joints sub-elliptical, the terminal one elongate, twice the length of the penultimate joint. Thorax testaceous or light yellowishbrown, somewhat shining; pleuræ with a grey bloom. Halteres ochreous, the club black. Abdomen deep violaceous-black, with the first two segments testaceous; ovipositor entirely ochreous or light testaceous, the valves slender, slightly curved. Coxe and femora testaceous, the latter with a black ring at apex; genua pale; tibiæ and tarsi black. Wings with a very pale yellowish tint, more yellow at the base, with a spot and two fasciæ of brown (all equidistant), also costal cell and apex of wing (from inner end of second posterior cell) clouded with brown; the spot filling bases of the basal cells; first fascia extending from origin of second longitudinal to tip of seventh longitudinal vein, interrupted only in the second basal cell; second fascia entire, extending from costa, at stigma, to posterior margin at fifth longitudinal vein; veins dark brown. Auxiliary vein reaching costa opposite inner end of first sub-marginal cell; sub-costal cross-vein opposite inner end of second sub-marginal cell; first longitudinal vein terminating in costa about mid-may between tips of auxiliary vein and anterior branch of second longitudinal; marginal cross-vein indistinct, short, about twice its length distant from tip of first longitudinal, and opposite the middle of anterior branch of second longitudinal vein; præfurca angulated at its origin, of moderate length; petiole of first sub-marginal cell very short; anterior branch of second longitudinal vein angulated at its base, sinuated, about half the length of posterior branch; second posterior cell half the length of the third posterior; discal cell somewhat longer than wide, the great cross-vein at its inner end; sixth longitudinal vein slightly and seventh distinctly sinuated.

Hab.—Lord Howe Island. One specimen.

Obs.—The specimen from which this species is described was, amongst other Diptera, etc., when collected, unfortunately placed in spirit instead of being pinned at once, hence it has greatly suffered in appearance and probably some of the colours have been altered.

372. GYNOPLISTIA MELANOPYGA, Schiner. (Pl. XXIII. fig. 36).

Gynoplistia melanopyga (3), Sch., Dipt. 'Novara' Exp. Zool. Theil, Bd. ii. p. 39, 1868.

Head shining black, with black hairs; rostrum, palpi and antennæ black; the latter 19- or 20-jointed; the first 12 or 13 flagellar joints with long branches, decreasing in length from the ninth or tenth joint, the thirteenth, when present, a mere rudimentary tooth; last five joints sub-elliptical, the terminal one usually more elongate; the first two branches directed outwards. Thorax black, shining; pleuræ and coxæ with a grey or yellowishgrey bloom. Halteres brown with a black club. Abdomen reddish-fulvous; the first segment and last two or three, including forceps, violaceous-black (the apex of basal pieces of latter slightly reddish-brown); forceps armed with a single, somewhat thick, slightly bent appendage, tridentate at the extremity, and some peculiar appendages of the internal apparatus (Pl. xxiv., fig. 67). Coxe, tibiæ and tarsi black, except that the hind tibiæ are brownish-fulvous, with a slight black ring at base and a broad one at apex, sometimes also the fore and intermediate pair; femora reddish-fulvous, with a ring of black at apex. with a pale brownish tint, fulvous at base, the apex, costal cell and the posterior veins slightly infuscated; three brown spots; first spot filling bases of basal cells; second squarish, usually slightly smaller than the first, situated at origin of second longitudinal vein; third larger, somewhat roundish, extending from costa, at stigma, to inner end of discal cell. Auxiliary vein reaching costa almost opposite inner end of first sub-marginal cell; sub-costal cross-vein near its tip; first longitudinal reaching costa at a point more than midway between tips of auxiliary vein and anterior branch of second longitudinal vein; marginal cross-vein

rather more than its length distant from tip of first longitudinal and at middle of anterior branch of second longitudinal vein; præfurca moderately long, nearly straight, slightly arcuated at its extreme base; petiole of first sub-marginal cell very short; anterior branch of second longitudinal vein arcuated at its base, very slightly sinuose, about half the length of posterior branch; the latter arcuated upwards at its extreme tip; second posterior cell more than half the length of third posterior; discal cell longer than wide, the great cross-vein situated at middle of its length; sixth longitudinal vein very slightly, and seventh distinctly sinuated.

Hab.—Sydney ("Novara" Exp.); ten specimens (Masters and Skuse).

373. Gynoplistia punctipennis, Westwood.

Gynoplistia punctipennis, Westw., Ann. Soc. Ent. Fr. IV. p. 682, 1835; Trans. Ent. Soc. III. p. 371, 1881.

Q.—"Capite et thorace cinereis; hujus dorso fusco, angulis humeralibus utrinque puncto nigricanti; abdomine fœm. obscure fusco, elongato, stylo rufescenti; alis limpidis, costa tenui, maculisque nonnullis parvis (ad conjunctionem venarum transversarum) alteraque stigmaticali majori fuscis; pedibus longioribus subtestaceis; femoribus tibiisque ad apicem fuscis, tarsorum articulis 2-4 albidis; antennis fœm. fuscis, basi pallidioribus, 16 l-articulatis, articulis 3-8 interne acute productis, vix ramosis. Long. corp. 7 lin. Exp. alar. 12 lin.

Hab.—Nova Hollandia. In Mus. Hopeiano Oxoniæ."

374. Gynoplistia bimaculata, sp.n. (Pl. XXIII., fig. 37).

Head black, somewhat shining, with black hairs; rostrum, palpi, and antennæ black, the latter 20-jointed; first 12 flagellar

joints with long branches, the last three or four branches a little decreasing in length; first two branches directed outwards; the last six joints elliptical, the terminal one narrow, elongate, cylindrical. Thorax black, shining, with yellowish hairs; pleuræ with greyish or yellowish-grey bloom. Halteres brown with black club. Abdomen reddish-brown (or mahogany colour) with a slightly cupreous appearance, densely clothed with yellowish pubescence, the first segment deep violaceous-black; forceps (Pl. xxiv., fig. 68) concolorous with rest of abdomen, armed with a single claw-shaped appendage. Coxæ black, with a hoary bloom. Femora fulvous or reddish-fulvous, with a broad ring of deep brown or black at the apex; tibiæ obscure testaceous, deep brown at extreme base and (more so) at the tip; tarsi deep brown. Wings with a pale brownish tint owing principally to cloudings on nearly all the veins; marked with two brown spots; costal cell and apex of wing pale brownish; first brown spot squarish, situated at origin of second longitudinal vein, the second larger, extending from costa, at stigma, to inner end of discal cell; veins dark brown. Auxiliary vein reaching costa opposite inner end of second sub-marginal cell; sub-costal cross-vein near its tip; marginal cross-vein situated rather more than its length distant from the tip of first longitudinal vein, and opposite middle of anterior branch of second longitudinal vein; præfurca moderately long, obtusely arcuated at its origin; petiole of first sub-marginal cell short, anterior branch of second longitudinal vein arcuated at its base, and gently bending upwards to the costa, about half the length of posterior branch; the latter bending gently downwards, arcuated upwards at its extreme tip; second posterior cell about two-thirds the length of third posterior; discal cell longer than wide, the great cross-vein at or beyond its middle; sixth longitudinal vein slightly and seventh distinctly sinuated.

Hab.—Berrima, N.S.W. Three specimens.

375. Gynoplistia flavipennis, sp.n. (Pl. XXIII., fig. 38).

♂-—Length of antennæ	0·130 inch	 3·30 millimètres.
Expanse of wings	0.350×0.090	 8.87×2.27
Size of body	0.440×0.060	 11.17×1.54

Q.—Length of antennæ..... 0.120 inch ... 3.04 millimètres. Expanse of wings..... 0.420×0.100 ... 10.66×2.54 Size of body 0.440×0.060 ... 11.17×1.54

Head shining, black, slightly violaceous, with short brownish hairs; rostrum, palpi, and antennæ brown or blackish, the rostrum and first two or three antennal joints more or less brownish-ochreous or even dull testaceous-yellow; & antennæ 19- or 20-jointed, the first 13 flagellar joints with long branches, the last four or five branches decreasing in length; last four or five joints more or less elliptical; in Q 18-jointed, the first 10 flagellar joints with short branches, the tenth a mere tooth; remaining six joints more or less elliptical, the terminal one elongate; in both sexes the first two branches directed outwards. Collare deep brown. Thorax black, levigate, with yellowish hairs; scutellum brown; metanotum violaceous-black; pleuræ with a hoary bloom. Halteres brownishochreous. Abdomen testaceous to light reddish-brown, shining, the first segment and genital organs deep violaceous-black, the Q ovipositor sometimes more brown; & forceps smaller than in G. bimaculata, and the terminal claw-shaped appendages more slender and more hooked (Pl. xxiv., fig. 69); Q ovipositor slightly curved. Coxe black, with hoary bloom; trochanters fulvous; femora fulvous, ringed (broadly in hind pair) with brown at the apex; tibiæ obscure testaceous or yellowish-brown, infuscated at the apex; tarsi brown. Wings pellucid, with a pale yellow tint, the origin of præfurca and inner ends of sub-marginal cell sometimes indistinctly infuscated; stigma distinct, rather elongated, brownish; veins dark brown. Auxiliary vein reaching costa opposite middle of petiole of first sub-marginal cell; sub-costal crossvein near its tip; marginal cross-vein situated rather more than its length distant from tip of first longitudinal vein and considerably before middle of anterior branch of second longitudinal vein; præfurca moderately long, obtusely arcuated or angulated at its origin; petiole of first sub-marginal cell short, usually longer than marginal cross-vein; anterior branch of second longitudinal vein almost angulated at its base, and bending gently upwards to costa; small cross-vein extremely short or obsolete, so that the discal cell is in contact with second sub-marginal, and forms rather more than a right angle; discal cell nearly twice as long as wide, the great cross-vein near its inner end; sixth longitudinal vein slightly and seventh distinctly sinuated.

Hab.—Upper Hunter, N.S.W. (Masters). Seven specimens.

Obs.—Easily distinguished from all other species by its spotless wings. A very distinct species, evidently most allied to the last, G. bimaculata.

376. Gynoplistia viridis, Westwood. (Pl. XXIII. fig. 39).

Gynoplistia viridis, Westw., Lond. and Edin. Phil. Mag. 1835 (?); Macquart, Dipt. Exot. I. p. 44, pl. 3, f. 1, 1838; Cænarthria viridis, Thomson, Dipt. 'Eugenia' Exp. p. 446, pl. 9, f. 1, 1868.

 \mathcal{J} .—Length of antennæ0.100 inch2.54 millimètres.Expanse of wings 0.250×0.070 6.34×1.77 Size of body 0.270×0.050 6.85×1.27

Head æneous-green, nitidous. Rostrum, palpi, and antennæ brown, the latter 16-jointed; joints of scapus sometimes obscure testaceous; first 10 flagellar joints with a simple branch, the last three branches diminishing in length; eleventh usually with a slight projection, sometimes also twelfth, more rarely the eleventh with even a short branch; first two branches directed outwards; terminal joints elliptical, about equal in length. Thorax æneousgreen, slightly chalybeous anteriorly, nitidous; pleuræ griseopruinose. Halteres fulvous-yellow. Abdomen reddish-ochraceous,

the first and last three segments (including genitalia) violaceousblack, cupreous; sub-nitidous, sub-glabrous (Pl. xxiv. fig. 70, forceps). Coxe griseo-pruinose. Femora and tibiæ fulvous, with a short ring of obscure fuscous at apex; tarsi obscure fuscous; metatarsal joint usually brownish towards base. Wings pellucid, somewhat yellowish, especially at base, more or less tinted with very pale brownish on basal half; with one indistinct and two distinct fuscous spots; first filling inner ends of the basal cells, second, a small squarish spot at origin of second longitudinal vein; the third larger, extending from costa to inner end of discal cell; fifth longitudinal vein infuscated; veins and stigma fuscous. Auxiliary vein appearing to either reach costa or first longitudinal vein slightly before inner end of second sub-marginal cell; sub-costal cross-vein blurred, situated immediately before tip; marginal cross-vein indistinct or scarcely visible, short, situated a little before tip of first longitudinal vein; anterior branch of second longitudinal vein angulated near its base; præfurca rather angulated at its origin; petiole of first sub-marginal cell short; second sub-marginal cell very little longer than first posterior cell; second posterior cell not half the length of third posterior cell; small cross-vein not half the length of basal portion of third longitudinal vein; great cross-vein joining at or immediately before middle of discal cell.

 ${\it Hab}.$ —Sydney (Eugenia Exp.); Sydney and Tasmania (Masters). Four specimens.

 $Var.\ \beta$. Abdomen with first two and last four abdominal segments violaceous-black. Legs entirely obscure fuscous, except rather more than basal half of femora fulvous. Basal half of wing not so distinctly tinted with pale brownish; the two costal spots more distinct, and with a third oblong paler one filling basal portion of the two basal cells. In other respects exactly like the above.

Hab.—Blue Mountains, N.S.W. (Masters). One specimen.

Obs. 1. Macquart attaches Westwood's name to the above, but this latter author does not even refer to this species in his sum-

mary of Exotic Tipulidæ (Trans. Ent. Soc. Lond. 1881, p. 363). I have not seen Westwood's original description; there may be some mistake. However, from careful comparison of specimens with Macquart's and Thomson's descriptions, I cannot help concluding that both refer to the same species. Thomson himself notices the great resemblance of his species to *G. viridis*, Westw., with which he compares it.

- Obs. 2. The above-described is undoubtedly Cænarthria viridis, Thoms. The species has no claims to be separated from Gynoplistia.
- Obs. 3. Macquart gives the description of the Q of G. viridis, Westw., which corresponds with an old damaged specimen of this sex before me, obtained by Mr. Masters in Tasmania. The lateral borders of the segments are dark coppery, and the ovipositor is fulvous. The male does not differ from Sydney specimens.
 - B. Tibiæ with a pale ring.
 - 377. Gynoplistia annulata, Westwood. (Pl. XXIII. fig. 40).

G. annulata, Westw., Lond. and Edin. Phil. Mag. VI. p. 280, 1835; Macquart, S. à B. II. Suppl. p. 650; Westw., Trans. Ent. Soc. III. p. 371, 1881, pl. xvIII. fig. 7; O.-Sacken, Mon. Dipt. N. Amer. IV. p. 329, 1869; Studies, II., p. 211, 1887.

Q.—Length of antennæ..... 0.110 inch ... 2.79 millimètres. Expanse of wings...... 0.420×0.140 ... 10.66×3.55 Size of body....... 0.420×0.085 ... 10.66×2.14

Head black. Rostrum, palpi, and antennæ dark brown, the latter 17-jointed; flagellar joints 1-9 with a short obtuse branch, gradually becoming longer to the fifth or sixth joint, from thence diminishing in length; tenth joint with a small projection on the inner side; first two branches directed almost outwards; terminal joint elongate, more than twice the length of the one next before it, appearing as if made up of three compressed joints. Entire

thorax, coxe, and trochanters fulvous, opaque. Halteres black. Abdomen black, densely covered (sparingly on venter and first superior segment) with very pale yellowish sericeous hairs; ovipositor brown. Legs brown; tibiæ ringed with white in the middle, the ring on the fore pair narrow and somewhat blurred; tarsi with the first joint fulvous at the base. Wings fuscous; veins brown; stigma slightly darker than wing-membrane. Auxiliary vein joining first longitudinal vein opposite inner end of second sub-marginal cell; marginal cross-vein situated about midway between tip of auxiliary vein and tip of first longitudinal; inner end of first sub-marginal cell immediately beyond inner end of second sub-marginal; small cross-vein nearly half the length of basal portion of third longitudinal vein; second posterior cell rather more than half the length of third posterior; great cross-vein joining at middle of discal cell.

Hab.—Near Sydney, N.S.W. (Masters). A single specimen.

Obs.—Westwood described the above as a N. American insect, and Baron Osten-Sacken (Mon. Dipt. N. Amer. I. p. 13, 1862), doubted the probability that the locality given was the correct one. The describer points out that "the label attached to the type specimen in the Oxford Museum is in the hand writing of Mr. Hope, and is clearly written N.A." Since the insect has only been found in Australia we must conclude that Hope meant N. Australia and not N. America by the letters on the label.

378. Gynoplistia Macquarti, sp. n.

Gynoplistia Macquarti n.nov. for G. cyanea (præoc.) Macquart, Dipt. Exot. 4th Suppl. p. 13, 1850.

"Q.—Cyanea nitida. Pedibus nigris; femoribus basi rufis; tibiis posticis annulo albo. Alis fusco-maculatis."

Body of a blackish violet-blue, shining, with slight green reflections. Rostrum, proboscis, palpi and antennæ black. Pleuræ with a white down. Abdomen with tawny oviduct.

Femora with anterior half tawny; the yellowish-white ring of the posterior tibiæ situated a little beyond the middle. Halteres tawny. Wings clear, with two spots and extremity brown; the spots to exterior margin, the first at base of marginal vein, not extending beyond the externo-median; the second at base of submarginal vein, extending to the discoidal cell; the cross-veins slightly bordered with brown; the venation as in G. variegata G. valla, Walk.). Long. 5×1 .

Hab.—Tasmania.

Obs.—I am compelled to re-name this species, cyanea having been used by Westwood for another species in 1835. The above (judging by descriptions only) seems to much resemble G. apicalis, Walk., from the same locality.

379. Gynoplistia viridithorax, sp.n. (Pl. XXIII., fig. 41).

Q.—Length of antennæ..... 0.100 inch ... 2.54 millimètres. Expanse of wings..... 0.380×0.110 ... 9.64×2.79 Size of body.... 0.440×0.070 ... 11.17×1.77

Head deep metallic shining green; sparsely clothed with short hairs; rostrum, palpi and antennæ black; the latter 17-jointed; first 8 flagellar joints with short branches, first two directed not quite outwards, the last one a mere tooth; next six joints elliptical; the terminal joint elongate. Thorax deep metallic shining green, with slight bluish reflections; pleuræ with an oblique hoary stripe, directed to intermediate coxæ; scutellum tinged with brown. Hal-Abdomen rather dark reddish-fulvous, teres testaceous-brown. shining, almost cupreous; the first two segments entirely, and the following five more or less distinctly bordered laterally with violaceous-blue; ovipositor concolorous with abdomen, the valves long, slightly curved. Coxe black, hoary; trochanters brown; femora fulvous or testaceous, more or less brownish at apex; tibiæ brown, paler at base, and becoming black towards apex, with a whitish or pale yellowish ring just beyond middle; tarsi black. Wings subhyaline, with a very pale yellowish tint, and two brown spots;

first spot small, square, at origin of second longitudinal vein, the second an abbreviated irregular fascia, extending from costa, between tips of auxiliary and first longitudinal veins (where it is broadest), to lower end of a small cross-vein; veins black or deep brown; the veins closing each end of discal cell and the great cross-vein slightly infuscated. Auxiliary vein reaching costa beyond inner end of second sub-marginal cell; sub-costal crossvein near its tip; marginal cross-vein almost invisible, situated about twice its length distant from tip of first longitudinal vein, and opposite one-third the length of anterior branch of second longitudinal; præfurca obtusely angulated at its origin, the remainder straight; petiole of first sub-marginal cell short, as long as great cross-vein; anterior branch of second longitudinal vein a little arcuated at its base, gently curved upwards, half the length of posterior branch; the latter almost straight, slightly arcuated upwards at its extreme tip; second posterior cell two-thirds the length of the third posterior; discal cell longer than wide, the great cross-vein about opposite its middle; sixth longitudinal vein slightly and seventh considerably sinuated.

Hab.—Moonbar, Monaro, N.S.W., 3-3500 feet (Helms). March; one specimen in Coll. Australian Museum.

380. Gynoplistia apicalis, Walker.

Gynoplistia apicalis, Saund. MSS. In Ins. Saund. by Walker, Vol. I. Dipt. p. 447, 1856.

"\$\mathcal{Z}\$ and \$\mathcal{Q}\$.—Nigro-cyanea; antenn\alpha\$ et pedes nigra; pectus albidum; abdomen apice luteum; femora basi lutea; tibi\alpha\$ postic\alpha\$ albo fasciat\alpha\$; ala limpid\alpha\$, fasciis fuscis, venis nigris basi luteis; halteres testacei."

"Blackish blue. Antennæ and legs black. Pectus whitish. Abdomen luteous at the tip. Femora luteous towards the base; hind tibiæ with a white band. Wings limpid, with three dark brown spots along the costa, and with two paler brown spots in

the disk; tips brown; veins black, luteous at the base. Halteres testaceous. Length of the body, $4-4\frac{1}{2}$ lines; of the wings, 10 lines.

"Van Diemen's Land."

381. Gynoplistia fumipennis, Walker.

Gynoplistia fumipennis, Saund. MSS. In Ins. Saund. by Walker, Vol. I. Dipt. p. 448, 1856.

- "Q. Atra; pectus canescens; femora basi testacea; tibiæ posticæ fascia subapicali alba; alæ nigricantes."
- "Deep black. Pectus somewhat hoary. Femora testaceous towards the base; hind tibiæ with a white band towards the tip. Wings blackish; veins black. Length of the body, 5 lines; of the wings, 9 lines."
 - "Van Diemen's Land."

382. Gynoplistia Chalybeia, sp.n. (Pl. XXIII., fig. 42).

Head deep metallic shining blue, clothed at the back with black hairs; rostrum, palpi and antennæ black; the latter 16-jointed; first 10 flagellar joints with tolerably long branches; first two branches directed outwards; the last three decreasing in length; next three simple joints sub-elliptical; the terminal joint cylindrical. Thorax deep metallic shining blue; pleuræ with a hoary bloom. Halteres light fulvous. Abdomen deep shining violaceousblue; forceps black. Legs black; femora fulvous for less than the basal half; hind tibiæ with a broad whitish ring just beyond the middle. Wings hyaline, with three spots; the costal cell and apex of wing clouded with brown, also a small faint greyish clouding in anal angle, another larger between tip of seventh longitudinal and the fifth longitudinal vein, and a third filling basal

half of fifth posterior cell and extending along the cross-veins; the first brown spot filling basal portion of the two basal cells, second about equal to last, at origin of second longitudinal vein; the third the largest, roundish, extending from costa, at stigma, to discal cell; veins deep brown or black. Auxiliary vein reaching costa about opposite inner end of second sub-marginal cell; subcostal cross-vein close to its tip; marginal cross-vein indistinct, about its length distant from tip of first longitudinal vein and opposite middle of anterior branch of second longitudinal; præfurca obtusely angulated at its origin, running in one straight line with the petiole and posterior branch of second sub-marginal cell; the latter petiole very short, equal to marginal cross-vein; anterior branch of second longitudinal angulated at its origin, about half the length of posterior branch and almost as long as præfurca; posterior branch slightly arcuated upwards at its extreme tip; second posterior cell rather shorter than the third; discal cell rather longer than wide, the great cross-vein somewhat before its inner end; sixth longitudinal vein slightly and seventh distinctly arcuated.

Hab.—Mount Kosciusko, N.S.W., 5000 ft. (Helms). March; one specimen in Coll. Australian Museum.

Obs.—Differs from G. Macquarti and G. apicalis principally in being only half the size, and the abdomen not being fulvous at the extremity; apparently most like G. apicalis as regards wing-spots.

Genus 24. CEROZODIA, Westwood.

Cerozodia, Westw., Lond. and Edin. Phil. Mag. VI. p. 281, 1835; Ozocera, Westw., Zool. Journ. V. p. 449, pl. xxII. f. 5, antennæ (nec Ozodicera, Macq.); Cerozodia, Westw. Trans. Ent. Soc. Lond. 1881, p. 379; Osten-Sacken, Studies II. p. 211, 1887.

"Limnobiæ affinis. Alarum venæ ut in Gynoplistia nervosa * (fig. 10) depositæ. Antennæ, thorace longiores 32-articulatæ;

^{*} Gynoplistia vilis, Walk.

articulis 3tio ad 31mum ramulum longissimum gracilem pilosum e basi emittentibus (fig. 5); oculi maris maximi interne lunati, subtus fere conniventes. Palpi perbreves 3-articulati, articulo luno minuto, 2do majore subovato, 3tio paullo majori, spatuliformi. Thorax ovato-rotundatus. Abdomen maris longum cylindricum, unguibus duobus terminatum" (Westwood).

"Rostrum not longer than the head; palpi rather long (Westwood says: palpi perbreves?); as far as I can see, the last joint is not longer than the others. Thorax small compared to the length of the abdomen; the latter narrow, of equal breadth, very slightly broader at the forceps; the forceps seem to have the same structure as in *Gynoplistia*. Legs comparatively stout; tibiæ with spurs; empodia present. Wings: venation like that of *Gynoplistia*, with the exception in the course of the auxiliary vein (which ends in the first vein); first sub-marginal cell rather long, its proximal end but little distant from proximal end of the second sub-marginal; the second posterior with a long petiole; the great cross-vein near the middle of the discal cell" (Osten-Sacken).

Obs.—This form is quite unknown to me. Baron Osten-Sacken has seen the two original specimens from which the above was drawn, enumerates additional characters of the genus, and moreover describes another species (Studies II. p. 213) from New Zealand. In a δ specimen of the latter in the possession of Baron Osten-Sacken the antennæ are 39-jointed, whilst in another of the same sex in the Berlin Museum the antennæ are 36-jointed. Towards the tip of the antennæ the branches and joints both seem to be liable to modifications similar to those observed amongst the closely allied Gynoplistice.

383. CEROZODIA INTERRUPTA, Westwood.

Cerozodia interrupta, Westw., Lond. and Edin. Phil. Mag. VI. p. 281, 1835; Zool. Journ. V. p. 449, pl. xxii. fig. 5, antenna, 1835; Trans. Ent. Soc. Lond. 1881, p. 379, pl. xix. f. 13; Osten-Sacken, Studies II. p. 213, 1887.

"Pallida, ochracea, thorace sub-obscuriore; oculis nigris; antennarum ramulis pallide fuscis; alis pallidis venis sub-fuscis, 'linea gracili interrupta cinerea per areolam elongatam sub-costalem currente" ("this means the first basal cell," Osten-Sacken).

Hab.—Swan River, Western Australia. Hopean Mus. Oxford.

Obs.—Length 21 mm.; the number of antennal joints is 32 (Osten-Sacken).

Section V. ANISOMERINA.

"Two sub-marginal cells (only one in Cladolipes); three, four, or five posterior cells; discal cell closed or open; sub-costal cross-vein near the tip of the auxiliary vein, posterior to the origin of the second vein. Eyes glabrous. The normal number of the antennal joints is six in the male and not more than ten in the female. Tibiæ with spurs at the tip; empodia distinct; ungues generally smooth." (Osten-Sacken.)

Obs.—This section embraces only four genera, Anisomera, Meig., Cladolipes, Loew, Penthoptera, Schiner, Eriocera, Macq.; the first three occur in Europe and N. America, and the last one predominates in tropical America, Asia, and Africa. No Australian examples have yet been recorded.

Section VI. AMALOPINA.

"Two sub-marginal cells; four or five posterior cells; discal cell closed or open; sub-costal cross-vein far removed from the tip of the auxiliary vein and anterior to the origin of the second longitudinal vein. Tibiæ with spurs at the tip; empodia distinct. Eyes pubescent; front usually with a more or less distinct gibbosity. Normal number of antennal joints sixteen or thirteen." (Osten-Sacken).

Six genera belong here. Four of these are common to Europe and America, and two are known only in N. America; and besides the European and American representatives of this section, the

two species of *Amalopis* hereafter described are the only examples that have been recorded from any other country. The genera fall into three groups, distinguished by the number of antennal joints supported by peculiarities of alar-venation.

Genus 25. AMALOPIS, Haliday.

Amalopis, Hal., in Ins. Brit. Dipt. p. xv. 1856; Bophrosia (ex parte), Rondani, Prod. I. p. 183, 1856; Crunobia, Kolenati, Wien. Ent. Mon. IV. p. 391, 1860; (?) Nasiterna, Wallengren, Ent. Tidskr. Stockh. pp. 179 and 191, 1881; Amalopis, O.-Sacken, Mon. Dipt. N. Amer. IV. p. 260, pl. 2, f. 15 (wing), pl. 4, f. 30 (genitalia), 1869; Studies, II. p. 224, 1887.

"Two sub-marginal cells; five posterior cells; discal cell generally present, sometimes wanting; the sub-costal cross-vein is more or less anterior to the origin of the second longitudinal vein; the second sub-marginal cell is never longer (usually distinctly shorter) than the first posterior cell; the tip of the wing is rounded in both sexes (not sinuate posteriorly as in Pedicia). Tibiæ with spurs at the tip; empodia distinct; ungues smooth. Eyes pubescent; front with a gibbosity behind the antennæ; the latter 16-jointed, short (not reaching much behind the collare when bent backwards). Male forceps more or less club-shaped, with stout, branched horny appendages." (Osten-Sacken.)

Obs.—The length of the fourth posterior cell and position of the great cross-vein in A. nigritarsis seem peculiar; also the præfurca is unusually short.

384. Amalopis nigritarsis, sp.n.

♂.—Length of antennæ	0.050 inch	1.27 millimètres.
Expanse of wings	0.380×0.090	9.64×2.27
Size of body	0.320×0.040	8·12 × 1·01
Q.—Length of antennæ	0.050 inch	1·27 millimètres.
Expanse of wings	0.500×0.120	12.70×3.04
Size of body	0.440×0.060	11·17 × 1·54

Head greyish-brown: rostrum palpi, and antennæ brown or blackish, the two basal joints of latter sometimes ochreous; first flagellar joint somewhat elongate, the rest globose to elliptical; extremely short verticils. Collare ochreous, tinged with brown. Thorax ochreous, dull, with three broad black stripes; intermediate stripe reaching suture; posterior portion of thorax, with scutellum and metanotum, with a greyish bloom, usually somewhat infuscated with brownish; pleuræ somewhat tinged with brown, and having a greyish bloom. Halteres ochreous, the club infuscated. Abdomen dusky dull brown, sparingly sprinkled with yellowish pubescence, sometimes the margins of segments tinged with reddish-ochreous; venter also more or less tinged with same; genitalia ochreous or reddish-ochreous; & forceps apparently something like those of A. inconstans (Mon. Dipt. N. Amer. Pl. IV. fig. 30), but there is a distinct anal style, and the pair of small horny appendages (h) seem to be wanting; Q ovipositor rather short, somewhat curved, the upper and lower valves about equal in length. Coxe, femora and tibiæ fulvous; the latter two with a black ring at the apex, the tibiæ also slightly infuscated, sometimes entirely brownish; tarsi black. Wings slightly tinted with yellowish or pale brownish, fulvous at the the base; pale greyish clouds (sometimes scarcely perceptible) at origin of præfurca, bases of sub-marginal cells and on the crossveins; stigma elongate, pale brownish; veins brown or blackish, the auxiliary vein somewhat fulvous. Auxiliary vein reaching costa opposite the tip of fifth longitudinal vein; sub-costal crossvein situated before origin of præfurca a distance equal to more than twice the length of great cross-vein; marginal cross-vein its length distant from tip of first longitudinal vein; præfurca short, originating considerably beyond the middle of the wing, more or less arcuated, usually a little more than half the length of anterior branch of second longitudinal; second sub-marginal cell a little shorter than the first (in one instance both of equal length, their inner ends and small cross-vein meeting at one point); small cross-vein joining petiole of second sub-marginal cell at varying points; discal cell elongate, as long or longer than third basal

cell, usually closed, sometimes opened posteriorly; great crossvein joining exactly at inner end of fourth posterior cell which is close up to inner end of discal cell; sixth and seventh longitudinal veins almost straight.

Hab.—Sydney (Masters & Skuse); Mount Kosciusko (4-5000 ft.), N.S.W. (Helms); one specimen in Coll. Australian Museum. September to March.

Obs.—Apparently distinct from A. congrua, Walk. Six specimens only before me.

385. AMALOPIS CONGRUA, Walker.

Limnobia congrua, Walk., List Dipt. Brit. Mus. I. p. 42, 1848; Amalopis congrua, O.-Sacken, Mon. Dipt. N. Amer. IV. p. 264, 1869.

"Fulva, thorace fusco trivittato, abdomine fusco fasciato, antennis fuscis, pedibus fulvis, coxis femoribusque basi pallidis, alis subfulvis.

"Body tawny; eyes bronze colour; feelers and palpi brown, the former yellow at the base; chest with three brown stripes, the middle one broad and long; hind borders of the segments of the abdomen brown, and this colour occupies the whole of the segments towards the tip, except the last, which, with its appendages, is bright tawny; legs dull tawny; hips and base of the thighs pale tawny; wings with a very slight tawny tinge; veins brown; poisers whitish-yellow, their knobs darker. Length of of the body, 4 lines; of the wings, 9 lines.

Hab.—Swan River, W. Australia.

Obs.—Unknown to me.

EXPLANATION OF PLATES.

PLATE XXI.

Fig.	1.	Wing of	Dicranomyia punctipennis (\mathfrak{P}).
Fig.	2.	,,	$,$, $saxatilis$ (\mathfrak{P}).
Fig.	3.	,,	,, marina.
Fig.	4.	,,	,, $remota (?).$
Fig.	5.	,,	$,,$ cuneata (δ).
Fig.	6.	,,	Thrypticomyia aureipennis (3)
Fig.	7.	,,	Trochobola australis (δ).
Fig.	8.	,,	Libnotes strigivena.
Fig.	9.	,,	Rhamphidia communis.
Fig.	10.	,,	Orimarga australis.
Fig.	11.	,,	Leiponeura gracilis.
Fig.	12.	,,	Rhypholophus (Amphineurus) umbraticus (\mathfrak{P}).
Fig.	13.	,,	Tasiocera tenuicornis (3), the veins denuded
			of hairs.
Fig.	14.	,,	Gnophomyia fascipennis (♀)

PLATE XXII.

Fig.	15.	Wing	of	Rhabdomast	ix Osten-Sackeni (3).
Fig.	16.	,,		Lechria sing	gularis (&).
Fig.	17.	,,		Trentepohlic	a australasiæ (ð).
Fig.	18.	,,		Limnophila	leucoph x ata (x).
Fig.	19.	,,		,,	obscuripennis.
Fig.	20.	,,		,,,	aureola (3).
Fig.	21.	,,		,,	$ocellata$ (\mathfrak{P}).
Fig.	22.	,,,		,,	imitatrix.
Fig.	23.	,,		,,	antiqua.
Fig.	24.	,,		,,	interventa (♀)
Fig.	25.	,,		٠,	inordinata (3).
Fig.	26.	,,		,,	luctuosa (♀)
Fig.	27.	,,		,,	levidensis (3).
Fig.	28.	,,		,,	Lawsonensis (φ).

PLATE XXIII.

Fig. 29	. Wing of	Limnophila	australasiæ.
Fig. 30	, ,,	Gynoplistia	vilis.
Fig. 31	٠,,	,,	cyanea (φ).
Fig. 32	, ,,	,,	obscurivena (♀).
Fig. 33	. ,,	,,	bella.
Fig. 34	. ,,	19	Westwoodi (\mathfrak{P}).

PLATE XXIII.—continued:—

Fig.	35.	Wing of	Gynoplistia	Howensis (\mathfrak{P}).
Fig.		,,	,,	$melanopyga$ (\mathcal{F}).
Fig.	37.	,,	,,	bimaculata (3).
Fig.	38.	,,	21	flavipennis.
Fig.	39.	,,	,,	viridis (&).
Fig.	40.	,,	,,	annulata (\mathfrak{P}).
Fig.	41.	,,	,,	$viridithorax$ (\mathfrak{P}).
Fig.	42.	.,	12	chalybeia (3).

PLATE XXIV.

Fig.	43.	Male forceps of Dicranomyia marina.
Fig.		,, Thrypticomyia aureipennis.
Fig.	45.	Portion of antennæ of Thrypticomyia aureipennis (3).
Fig.	46.	Labium and palpi of Geranomyia picta.
Fig.	47.	,, ,, lutulenta and annulata.
Fig.	48.	,, ,, fusca.
Fig.	49.	Male forceps of Geranomyia picta.
Fig.		,, fusca.
Fig.	51.	,, Limnobia bidentata.
Fig.	52.	,, Trochobola australis.
Fig.	53.	Palpus of Leiponeura brevivena.
Fig.	54.	Antenna of Leiponeura brevivena.
Fig.	55.	One-half of a male forceps of Tasiocera gracilicornis.
Fig.	56.	Antenna of Tasiocera gracilicornis.
Fig.	57.	Male forceps of Rhabdomastix Osten-Sackeni.
Fig.	58.	,, Lechria singularis.
Fig.	59.	,, Trentepohlia australasiæ.
Fig.	60.	Mouth-parts of Conosia irrorata; aa, palpi.
		Antenna of Conosia irrorata.
Fig.	62.	One half of male forceps of Conosia irrorata.
Fig.	63.	Male forceps of Limnophila antiqua.
Fig.	64.	,, australasiæ.
Fig.	65.	One-half of male forceps of Gynoplistia vilis
		Male forceps of Gynoplistia bella.
Fig.		,, melanopyga.
Fig.	68.	", bimaculata.
Fig.	69.	,, flavipennis.
Fig.	70.	", viridis.

Obs. — For full terminology of venation, male forceps, etc., see Mon. Dipt. N. Amer., IV., 1869, pp. 26-35, by Baron O.-Sacken.

Note.—All the figures drawn to the same scale, irrespective of their natural size.

THE OSTEOLOGY AND MYOLOGY OF THE DEATH ADDER (ACANTHOPHIS ANTARCTICA).

By W. J. McKay, B.Sc.

(PLATES XXV.-XXVII).

The observations contained in this paper were made in the Biological Laboratory of the Sydney University, through the kindness of Dr. Haswell, whom I have to thank for having suggested the subject, and for aiding me by his advice. I have likewise to thank Mr. James Wilson, M.B., also of the University, for his assistance regarding the homology of certain of the muscles. Lastly I am much indebted to the Trustees of the Australian Museum, and to Mr. Douglas Ogilby for supplying me with many specimens.

My first object in studying the Death Adder was to ascertain if there were any grounds for considering it to be a viper. On referring to the literature on the bones and muscles of the Ophidia, I saw that there was ample room for a paper on both, for while the bones of the head have been examined by many observers, none so far as I could ascertain had described them with reference to the exact position of the muscular attachments.

With regard to the muscles of the head and body, I found that there had been few observers; and that almost no work had been done as regards morphology. I therefore determined to apply the ideas put forward by Humphry in his admirable papers on Morphology, and endeavour to throw some light on the homology of the various muscles.

Of the observers who have written on the muscles of the snake D'Alton appears to me to be the most accurate. The latest work is

by Hoffmann, whose descriptions are however only paraphrases of the fuller ones given by D'Alton. Cuvier, Home, Huebner, Meckel, Dugès, Duvernoy, Owen, R. Jones, Teutleben, have all contributed something; Duvernoy particularly has given an admirable description of the muscles of the head in many snakes.

I have endeavoured in the case of each muscle to find its homologue, and where I am doubtful I have retained the name by which the muscle is usually known. I have discarded the use of compound descriptive titles where possible; for I consider that while they may convey a notion of the position of the muscle, they are of little use if they do not at the same time throw light upon the homology of the part.

I have dissected several snakes for comparison, among them being Pseudechis porphyriacus, Diemenia superciliosa, Morelia spilotes, Daboia Russelli (?).* In addition to these, several lizards, Hinulia, Grammatophora, &c., and I made a special dissection of a specimen of Hydrosaurus varius. For some points in connection with the muscles of the head, I dissected a few birds, while in addition to these I was constantly engaged in dissecting the human body. Lastly I have dealt with the vertebræ and their various movements, and have devoted considerable time to the study of the mechanism of the jaws.

Osteology.—Bones of the Skull.

OS PARIETALE.

Os Parietale, D'Alton, Cuvier, Gegenbaur, Hallmann, Harting, Hoffmann, Huxley, Meckel, Joh. Müller, Owen, Parker, Parker, and Bettany, Rathke, Stannius, Wiedersheim.

The parietal consists of a horizontal and two lateral vertical plates. The horizontal plate is an irregular octagon broader anteriorly than posteriorly. It consists of the two moieties of the parietal that have coalesced along the mid-line, but there is no sign of a suture remaining. The anterior border is concave and bevelled

^{*} I am in some doubt if the snake dissected was a Daboia; it was certainly a viper.

from before backwards and downwards for articulation with the frontals. The antero-lateral border is concave and smooth, the superior portion of the postorbital articulating with it. The middle lateral border is rounded and smooth, the masseter gliding over it. The postero-lateral border runs backwards and inwards. It has a small tubercle dividing it into an anterior third and a posterior two-thirds. The parieto-pterygoid muscle arises in part from the anterior third, while the anterior temporal arises from the posterior two-thirds. The anterior extremity of the squamosal abuts against the tubercle. The posterior border is the smaller, and is formed like the anterior of the right and left moieties of the parietal. It is serrated for articulation with the supraoccipital.

The superior surface of the parietal taken as a whole is convex. It may be divided for convenience of description into three triangles, a median and two lateral.

The median triangle has its base at the anterior border, and its apex in the mid-line on the posterior border. This triangle is subcutaneous and concave anteriorly. A dark line is seen in the mid-line, indicating where the two halves have coalesced. In Python a prominent crest may be seen. The greater development of the crest being, as in the Carnivora, for the attachment of the powerful muscles of the mandible, the muscles being much more powerful in these snakes which have to rely on strength, and not on their poison, for self-defence, and for obtaining their prey.

On either side of the median triangle lies a lateral one. The base of each lateral triangle is irregular, and consists of an anteroand middle-lateral side. The apex is the posterior border. The lateral triangles present a series of concave and convex surfaces. From the inner portion of the triangle the masseter arises, from the outer portion the anterior temporal, and part of the parietopterygoid.

Where the middle lateral joins the postero-lateral border a well marked prominence of bone is developed, and from this and a portion of the superior surface the parieto-mandibular muscle arises.

The inferior surface presents four concavities, an anterior pair for the cerebral hemispheres, and a posterior pair for the optic lobes. Posteriorly the surface is much bevelled from behind, downwards and forwards, so as to rest on the supraoccipital and epiotic bones.

The lateral plates of the parietal run downwards and inwards; both plates begin above at about the junction of the anterior with the antero-lateral edge, and run back as far as the tubercle on the postero-lateral edge.

The external surface presents anteriorly a deep concavity which contains the lachrymal gland and a part of the orbit; and posteriorly another concavity from the upper part of which the parietopalatine muscle arises, and from the lower portion the sphenovomerine. A well marked ridge separates these concavities, and to this is attached the fascia covering in the lachrymal gland. The ridge if followed up is seen to end in the prominent projection above, and to this is attached a band of fascia covering the poison gland. The internal surface of the lateral plate is concave for the optic lobes. The anterior border is irregular, with splints of bone for articulation with the frontal and orbitosphenoid. A semicircular excavation represents the posterior portion of the optic foramen. The posterior border is triangular in outline; it is rough for articulation with the prootic.

The inferior border is bevelled from above downwards and outwards, for articulation with the basisphenoid. The parietal articulates with the frontals, postorbitals, squamosals, prootics, supraoccipital, basisphenoids, and orbitosphenoids.

The parietal differs from the bone of *Python* in not having a median ridge; it differs from all the forms examined in having the well marked lateral process.

OS FRONTALE.

Os Frontale, all authors.

The frontal bones are not anchylosed to one another. Each presents a horizontal and a lateral plate. The horizontal plate is

quadrilateral, the antero-posterior being larger than the lateral The anterior border runs from within outwards and backwards. Where the internal two-thirds joins the external third, a peculiar process of bone projects which fits into a niche in the premaxilla, which will be more particularly described later on. The external third is concave, and forms portion of the supraorbital ridge. The posterior border is convex and articulates with the parietal; it has, however, no connection with the postorbital as in Python. This border is bevelled from before downwards and backwards, and fits in between the under portion of the anterior edge of the temporal and of the anterior edge of the lateral plate; thus a firm schindylesis is formed. The internal edge joins its fellow of the opposite side in the mid-line, a distinct frontal suture marking the junction. Anteriorly a plate of bone projects downwards vertically and meets the lateral plate in the mid-line. Thus by the two sides joining, a vertical septum of bone is formed, which separates portion of the cerebral hemispheres. The superior surface is quadrilateral, convex and subcutaneous. The lateral part of this bone consists of a plate that runs from the middle of the inferior surface downwards and in wards, meeting its fellow of the opposite side in the mid-line, where they lie on the parasphenoid. The external surface of the lateral plate is concave and smooth, and joins with the orbitosphenoid and the anterior portion of the lateral plate of the parietal to form the large orbital fossa for the eye and lachrymal gland. A notch in the posterior border of the lateral plate is portion of the optic foramen.

The frontal articulates with the parietal, parasphenoid, orbitsphenoid, premaxilla, and nasal bones.

OS POST-FRONTALE VEL POST-ORBITALE,

Zygomaticum vel Frontale posterius, D'Alton; Frontale posterius, Cuvier, Harting, Stannius; Post-frontale vel Post-orbitale, Gegenbaur, Parker, Parker and Bettany; Post-frontale, Huxley, Hoffmann, Wiedersheim; Schuppe des Schlafbeins, Meckel; Frontale posterius vel Orbitale posterius, Joh. Müller, Owen.

The postorbital is a semilunar-shaped bone. The upper half of the external surface gives attachment to the subcutaneous tissue which supports the orbital scales; the lower half becomes twisted on itself so that it comes to be posterior. To this is attached a process of the fascia enveloping the poison gland. The upper half of the internal surface is excavated for articulation with the antero-lateral edge of the parietal; inferiorly the surface comes to be anteriorly. The superior extremity does not articulate with the frontal as in *Python*, while the inferior approaches very near to the transverse bone. This bone forms the posterior portion of the orbital margin, but does not appear to be united to the transverse bone by ligament as it is in *Python*. Its chief difference from that of the non-venomous snakes is in its superior extremity non-articulating with the frontal.

OS NASALE.

Os Nasale, all authors.

The nasals consist of two bones. Each presents a horizontal and a vertical portion. The horizontal portion is a thin plate of bone triangular in outline. Its superior surface is convex, smooth, and subcutaneous. The inferior surface is concave and forms portion of the roof of the nasal canal. The anterior border is concave and gives attachment to the olfactory capsule. The posterior border also gives attachment to the same capsule. The internal edge is ill-defined being continuous with the vertical plate. The vertical plate is a thin leaf of bone that meets its fellow of the opposite side in the mid-line. They are not anchylosed together. Posteriorly the septum formed by the two bones runs back to articulate by a pointed extremity with the frontals, while anteriorly they articulate with the premaxilla; and inferiorly they rest between the angle formed by the olfactory cartilages and the nasal septum. These bones do not differ much in shape from the bones of Python, but in their relations they are quite dissimilar.

In Python the posterior border articulates throughout its whole length with the prefrontal, while here we see that it has no

connection whatever with the prefrontal. In *Pseudechis* there is a slight connection between the two bones, but in *Daboia* there is no other connection than by the membrane that bridges over the space left between the two bones. It is plain from the above arrangement that the prefrontal has a much more extended range of movement in the venomous forms than in the non-venomous.

OS PRÆMAXILLARE.

Intermaxillare, D'Alton, Cuvier, Harting; Præmaxillare, Gegenbaur, Huxley, Owen, Hoffmann, Parker, Parker and Bettany, Wiedersheim; Zwischen Kiefer, Stannius, Meckel.

The premaxilla is a T-shaped bone. The superior surface is smooth and convex, and runs upwards and backwards to form a nasal process which articulates with the vertical septum of the nasals. The inferior surface is horizontal and forms the anterior portion of the roof of the mouth. Posteriorly it is continued back to form a bifurcated palatine process. Between the inferior and superior surfaces there are small lateral plates to which the septomaxillary bones are articulated. It contains no teeth.

The bone closely resembles the premaxilla of *Python*, and of other forms examined. The chief difference to be noticed between the bones of the non-venomous and the venomous snakes is the relation of the premaxilla to the maxilla; owing to the latter bone in the non-venomous forms being much longer it approaches close to the premaxilla and is united to it by fibrous tissue.

OS SEPTO-MAXILLARE.

Ethmoideum, D'Alton, Wiedersheim; Cornet inférieur, Cuvier; Turbinal bone, Huxley, Owen; Riechbein, Leydig, Meckel; Septo-maxillare, Parker, Parker and Bettany; Concha, Stannius; Septo-maxillare, Hoffmann.

The septo-maxillary bones are two small shells on either side of the nasal septum. Each has a small vertical portion and a larger horizontal plate. The horizontal plate is triangular in outline, the base being posterior, the apex anterior, being joined to the premaxillary. The superior surface is concave, the outer portion bending upwards and inwards. It forms the floor of the nasal cavity. The inferior surface is convex and forms a roof for the nasal gland cavity of the vomer. The vertical portion is close to the septum nasi, and rests on the vertical plate of one of the vomers.

Os Vomer.

Os Vomer, all authors.

The vomers are constituted by two distinct bones, each of which has a vertical and a horizontal plate. The vertical plate of each bone approaches its fellow in the mid-line but is separated by a small amount of tissue. Above the vertical plate is in contact with the septo-maxilla and close to the nasal septum, while posteriorly the parasphenoid articulates with it.

The horizontal portion of the bone is triangular in outline, the base being at the mid-line. The anterior extremity is sharp and approaches close to the palatine process of the premaxilla. The posterior extremity is rounded and fades into the vertical plate.

The middle and external portion is convex below; it runs outwards and curls upwards, its superior surface forming the floor of the nasal gland, whose duct perforates the bone anteriorly. On the inferior surface of the bone the spheno-vomerine muscle is inserted. The nasal gland is contained in a box whose roof is formed by the septo-maxilla, the inner and inferior sides by the vomer, the external side being membranous. "Two small labial cartilages are attached to the duct of each nasal gland" (Parker).

OS BASISPHENOIDEUM.

Corpus ossis sphenoidei, D'Alton; Sphenoideum basilare, Hoffmann, Hallmann, Harting, Stannius; Sphenoideum, Cuvier, Joh. Müller, Owen; Basisphenoid, Gegenbaur, Huxley, Parker, Parker and Bettany, Wiedersheim; Körper des Keilbeinstückes, Meckel; Körper des vorderen, Körper des hinteren Keilbeins, Rathke.

OS PARASPHENOIDEUM.

Parasphenoid, Huxley, Hoffmann, Parker, Parker and Bettany; Presphenoid, Owen.

The basisphenoid and parasphenoid when detached from the skull together make up a triangular-shaped bone, the apex of which is anterior.

The anterior portion of the inferior surface constituted by the parasphenoid is deeply excavated, differing much from the corresponding surface in Python, in which there is a very prominent ridge, giving attachment to the dense fascia of the roof of the mouth. On each side of the anterior portion the spheno-vomerine muscles are placed. The unossified trabeculæ can be seen running forward from a point just below the optic foramen in a small groove on either side of the bone and just beneath the inferior portions of the frontals. The trabeculæ when traced forward are seen to "unite underneath the fore part of the frontals and become compressed into a vertical ethmoidal plate passing on into the nasal septum" (Parker). The posterior portion of the inferior surface is convex. A small ridge exists in the mid-line which gives attachment to the strong fascia of the region. On either side of the ridge is an excavated surface from which the sphenopterygoid muscle arises. In Python this portion of the bone is very different. There is a very prominent median ridge, and on either side of the ridge is a large wing-like process which corresponds to the basipterygoid process of Lacertilians. A similar process occurs in Pseudechis. It gives origin to the sphenopterygoid muscle. The superior surface is convex in front, but deeply excavated posteriorly to form a hollow "which contains the pituitary body, a quantity of fibrous tissue, and the internal carotid arteries which pass into it laterally beneath the parietal shelf having previously perforated the basisphenoid" (Parker). "There is a posterior clinoid wall, arching over the hinder part of the pituitary body" (Parker). Posterior to this pituitary fossa the bone is concave to receive the mid-brain. "The anterior

extremity of the parasphenoid becomes compressed and knife-like, wedging in between the hinder ends of the vomers" (Parker).

The posterior extremity of the basisphenoid is broader, and from its middle point a quadrilateral outgrowth of bone springs. This is bevelled from above downwards and backwards, and is overlapped by the inferior surface of the basioccipital. The sides of the basisphenoid are bevelled from above downwards and outwards so as to articulate with the parietal above, and the prootic and alisphenoid. The parasphenoid articulates with the vomers, frontals, and basisphenoid. The basisphenoid with the lateral plates of the parietal, the prootics, basioccipital, parasphenoid, and alisphenoid.

OS BASIOCCIPITALE.

Corpus ossis occipitalis, D'Alton, Hallmann; Occipitale basilare, Cuvier, Gegenbaur, Wiedersheim, Hoffmann, Stannius; Occipitale basilare vel inferius, Harting; Basioccipitale, Huxley, Parker, Parker and Bettany; Körper des Hinterhauptstückes, Meckel; Occipitale inferius, Joh. Müller, Owen; Grundtheil des Hinterhauptbeins, Rathke.

The basioccipital bone is an irregular hexagon. The anterior border is vertical for articulation with the basisphenoid. antero-lateral side is rough for articulation with the opisthotic and prootic; it runs outwards and backwards. The postero-lateral runs inwards and backwards, and articulates with the prootic and exoccipital. The posterior border constitutes the lower portion of the occipital condyle; below it is rounded, above it is grooved in the mid-line and bevelled from above downwards and outwards so as to receive the two processes from the exoccipital, which complete the trefoil-shaped condyle. The inferior surface is divided into an anterior and a posterior part by a transverse ridge. The anterior of the two portions has the suboccipital articular muscle attached to it. There are four spines projecting backwards from the ridge between these two portions. The median pair give insertion to the inferior part of the rectus capitis anticus of either side. The lateral pair give attachment to the superior part of the rectus

anticus, which is also inserted on the posterior half of the inferior surface of the bone. The sacro-lumbalis prolonged forward from the dorsal region is also attached to the lateral spines. The superior surface is deeply excavated to receive the medulla. The basi-occipital articulates with the basisphenoid, exoccipital, and prootic.

OS EXOCCIPITALE.

Pars lateralis ossis occipitis, D'Alton; Occipitalia lateralia, Cuvier, Gegenbaur, Hallmann, Harting, Joh. Müller, Owen, Stannius, Hoffmann, Wiedersheim; Exoccipitale, Huxley, Parker and Bettany, Parker; Gelenkstiick des Hinterhauptbeins, Meckel; Schenkel des Hinterhauptbeins, Rathke.

The exoccipitals are irregularly shaped bones which bound in great part the foramen magnum. Each bone consists of a superior horizontal, and a vertical lateral piece. The upper face of the superior piece is flattened and gives attachment to the spinalis dorsi, complexus, and trachelo-mastoideus. The anterior border articulates with the supraoccipital, the mesial border with its fellow of the opposite side, while the external is raised into a prominent edge to join the opisthotic, and gives attachment to some of the fibres of origin of the digastric muscle. The vertical or lateral plate presents a small tubercle for the attachment of the trachelo-mastoid, while immediately beneath this there is a second tubercle for the superior part of the rectus capitis anticus. The internal surface of this plate is in contact with the medulla. Four foramina may be seen on the surface. The anterior three lie in the same line, and transmit the ninth, tenth, and twelfth nerves; the fourth is placed superiorly and posteriorly, and is the "posterior condyloid foramen" (Parker). The anterior border articulates with the opisthotic, and slightly with the prootic, the inferior with the basioccipital, while the posterior runs downwards and backwards and goes to make up the occipital condyle by being the superior moieties of the trefoil-shaped surface. The foramen magnum is bounded almost entirely by these bones, the basioccipital supplying the lower portion only.

OS SUPRA-OCCIPITALE.

Squama ossis occipitis, D'Alton; Occipitale superius, Cuvier, Gegenbaur, Joh. Müller, Owen, Hoffmann, Wiedersheim; Squama occipitalis, Hallmann, Stannius; Occipitale superius vel squama occipitalis, Harting; Schuppe des Hinterhauptbeins, Meckel, Rathke; Supra-occipitale, Huxley, Parker, Parker and Bettany.

The supraoccipital is a very small quadrilateral-shaped bone formed by the coalescing of the moieties of the opposite sides at the mid-line; the suture can be made out. The bone runs downwards and backwards. The superior edges are closely joined to the epiotics, while the parietal rests upon them. The inferior edges articulate with the exoccipitals. The posterior surface of the bone gives attachment to the spinalis dorsi. The anterior surface helps to form portion of the cranial roof. In *Python* there is a well marked median ridge, indicating the line of junction of the opposite sides. The bone articulates with the parietal, epiotic, and exoccipital.

OSSA PERIOTICA.

Petrosum, D'Alton, Hallmann, Harting, Müller, Wiedersheim, Rocher, Cuvier; Felsentheil des Schlafbeins, Meckel; Epiotic, Prootic, Opisthotic, Huxley, Parker, Parker and Bettany, Hoffmann, Gegenbaur; Felsenbein, Rathke; Ala temporalis, Stannius.

The periotic bones are covered in part by the anterior portion of the squamosal. On this being removed the three bones are seen united by the characteristic Y-shaped synarthrosis.

The prootic lies anterior to the other bones. It is united superiorly with the epiotic, and superior plate of the parietal, while in front it joins the posterior portion of the lateral plate of that bone. Inferiorly it rests on the basioccipital and basisphenoid, while posteriorly it is in contact with the opisthotic and exoccipital. Its external surface is perforated by the large foramen ovale, and is in relation with the alisphenoid. The fifth nerve issues from the foramen ovale in two divisions, the anterior one

made up of the first and second parts of the nerve emerges in front of the alisphenoid, the posterior division behind. The small foramen for the seventh nerve is slightly posterior to the foramen ovale, while the eighth nerve emerges from a foramen placed close to the junction of the prootic with the epiotic. The bone also forms portion of the anterior boundary of the fenestra ovalis. It has the greater portion of the anterior semicircular canal running upwards and backwards to the epiotic, and it also has the anterior portion of the horizontal canal running forward to join the anterior.

The epiotic is closely united to the supraoccipital bone, and more anteriorly with the superior plate of the parietal. Inferiorly it joins the prootic, posteriorly the opisthotic. It contains the superior parts of the anterior and posterior semicircular canals. Portion of the digastric muscle arises from its external surface.

The opisthotic is in contact with the epiotic above, the prootic in front, the basioccipital below, and the exoccipital behind. It contains the chief part of the posterior semicircular canal which runs upwards and forward to end in the epiotic above. It also has the posterior portion of the horizontal canal running from the prootic in front. "The opisthotic forms the back margin of the fenestra ovalis, and forks in the fenestra rotunda nearly enclosing it" (Parker).

Os Alisphenoideum,

Alisphenoid, Parker, Parker and Bettany, Hoffmann.

The alisphenoid is a small quadrilateral-shaped line. It lies across the foramen ovale, and thus divides this orifice into two moieties. Its anterior border is concave, and forms the posterior rim of the anterior of the two orifices of the foramen ovale which transmits the first and second divisions of the fifth nerve; the posterior border bounds the foramen which transmits the third division. The superior border is joined to the prootic, while the external surface is smooth, and is in contact with the parieto-pterygoid muscle. A small foramen is present in the lower portion of this external surface; this transmits the nerve that

supplies the parieto-pterygoid. The inferior border rests on the basisphenoid below.

OS ORBITOSPHENOIDEUM.

Orbitosphenoid, Parker, Parker and Bettany, Hoffmann.

The orbitosphenoid is a thin plate of bone only to be distinguished with difficulty from the surrounding bones. It lies on the posterior and external portions of the lateral plate of the frontal, and articulates with the orbital portion of the parietal. It is reniform in outline, the concavity being anterior. The bone helps to form the orbital fossa, and enters by a small process into the formation of the optic foramen.

Os SQUAMOSUM.

Mastoideum, D'Alton, Harting, Joh. Müller, Owen; Squamosum, Gegenbaur, Huxley, Parker, Parker and Bettany, Wiedersheim, Hoffmann; Schläfenschuppe, Hallmann; Zitzenknochen des Schlafbeins, Meckel; Tympanicum vel squamosum, Rathke; Squama temporis, Stannius.

The squamosal is prismatic in outline, and presents superior, external, and internal faces.

The superior face is slightly convex anteriorly, while posteriorly it becomes narrow. The anterior portion gives origin to the posterior temporal, while the posterior portion has part of the digastric arising from it.

The external surface is convex. The anterior half gives origin to the posterior temporal; the posterior half is articulated to the quadrate by a convex facet. In *Python* it is the posterior extremity of the bone that is modified for articulation with the quadrate. The internal surface is broader anteriorly than posteriorly; its anterior two-thirds is concave for articulation with the convex facet in the epiotic. The posterior third projects backwards and portion of the digastric is attached to it. The anterior extremity abuts against the projection mentioned in connection with the postero-lateral border of the parietal.

The bone articulates with the parietal, quadrate, prootic, epiotic, and supraoccipital.

OS QUADRATUM.

Quadrathein, D'Alton; Quadratum, Gegenbaur, Hallmann, Huxley, Joh. Müller, Parker, Hoffmann, Parker and Bettany, Rathke, Wiedersheim; Quadratum vel Tympanicum, Owen, Stannius, Cuvier.

The quadrate is a prismatic-shaped bone with two articular extremities. The bone is twisted on its vertical axis from before outwards and backwards. The external side commences in a flat oval surface above, and runs downwards and backwards to end below in an external condyle. The posterior temporal muscle arises from the upper three-fourths of the surface. The posterior side commences as a slightly concave surface above, and runs downwards and backwards, and ends below in a flattened surface. The digastric muscle arises from this surface. The internal side begins above as a broad concave surface; it runs downwards and outwards, and inferiorly coming to lie anteriorly, owing to the twisting of the bone. The external pterygoid muscle arises from this surface. There are three edges to the bone. The posterior is the only one that calls for notice. It projects forwards, and curling round forms a concave surface, to the middle of which the columella and the stylohyal are united, and it also serves to give origin to the external pterygoid muscle and the suboccipital articular muscle.

The superior extremity is prismatic in outline. The external and anterior faces are the continuations upwards of the exterior and anterior faces of the shaft of the bone. The internal face is oval, concave from before back, broader anteriorly than posteriorly. It articulates with the facet on the external surface of the squamosal, a small synovial membrane being present. The lower surface is flattened from before backwards, and presents a striking similarity to the inferior extremity of the humerus of the human body. There is a small external and internal condyle, and a trochlear surface. The external condyle is sub-cutaneous. To

the internal is attached the internal pterygoid muscle, and a very strong internal ligament which unites it posteriorly to the articular bone below. The trochlear surface has its axis placed at right angles to the long axis of the head. It is the shape of an hour glass. The exterior portion is smaller and lower than the interior, since the axis of the extremity runs outwards and downwards. Both surfaces are convex from before back, while two surfaces go to make up a concavity from side to side. Each of the trochlear surfaces forms a semicircle, but the radius of the internal is to the radius of the external as two to one. Above the trochlear surface in front is a slight depression which receives the "coronoid" process of the articular.

The quadrate articulates with two bones, the squamosal, and the articular, and is in connection with the columella and stylohyal. This bone differs considerably in shape from the quadrate of *Python*. In the latter it is quadrilateral, and the inferior extremity is even broader than the superior. There is the same evident twist, but the bone is for the most part composed of an internal and external surface. The projection from the columella is also much more marked in *Python*. Comparing the size of the skull of the two snakes, the quadrate of *Acanthophis* is much more powerfully made than in *Morelia* or *Python*. In fact the quadrate is the most stoutly made bone in the head.

THE MANDIBLE.

Os Dentale, Os Angulare, Os Articulare, Harting, Gegenbaur, Hoffmann, Parker, Parker and Bettany, Owen, Wiedersheim. Os Dentale: L'os dentaire, Cuvier; Zahnstück, Meckel; Dentale, Stannius. Os Articulare: Articulare, Cuvier, Stannius; Gelenkstück, Meckel. Os Coronideum: Complementare, Gegenbaur; Kronstück, Meckel; Coronoideum, Hoffmann, Parker and Bettany, Parker; Complementare vel coronoideum, Stannius; Complementare, Owen. Os Spleniale: Spleniale, Parker and Bettany, Parker; Operculare, Stannius, Gegenbaur, Owen, Harting, Hoffmann. Os Supra-angulare: Supra-angulare, Parker and Bettany, Gegenbaur, Gegenbaur, Owen, Harting, Hoffmann.

baur, Owen, Parker, Wiedersheim; Complementare, Harting, Hoffmann.

The mandible is composed of two moities; an anterior single piece or dentary, and a posterior compound piece consisting of splenial, coronoid, angular, surangular, and articular. The shaft of the compound portion is bent so that the external side is convex. It has two surfaces and two borders.

The external surface runs from the dentary back to the extremity of the articular. The anterior two-thirds of it is made up of angular, and is convex; the posterior third of articular, and presents two concave surfaces and a ridge between them which runs from behind downwards and forward. The masseter is attached to the anterior two-fifths of the surface, the posterior temporal to the anterior of the two concave surfaces; between and above these muscles we have the anterior temporal inserted. The lower head of the internal pterygoid arises from the posterior of the two concave surfaces; while on the ridge between these surfaces the mylohyoid is inserted.

The internal surface is concave from before back. Anteriorly the splint-like splenial may be seen running back from the dentary, and expanding joins the coronoid; this lies immediately below the surangular no longer now to be made out as a separate element, though well seen in *Morelia*. From the posterior third of the surface the upper head of the internal pterygoid muscle arises. The middle third is convex and smooth, and over this portion the internal pterygoid glides.

As the superior edge runs back from the alveolar border of the dentary it bifurcates to enclose the large mandibular fossa into which is inserted the external pterygoid muscle. Immediately in front of the fossa the parieto-mandibularis is inserted; immediately behind is placed the sigmoid cavity of the articular, and posterior to this the edge expands into a triangular surface whereon the digastric is inserted, and over the external edge of which the retractor oris glides.

The articular surface bears a resemblance to the greater sigmoid cavity of the ulna. Its axis slopes from above downwards and inwards. A median ridge running back from a small "coronoid"-like process in front divides the cavity into two portions, each of which is concave from before back. The external portion is the smaller though deeper of the two, and serves to prevent the too ready dislocation of the jaw. The internal is large and shallow, and owing to the obliquity of the axis its excavated surface approaches much nearer the inferior edge than does the surface on the external side. The trochlear surface of the quadrate meets this sigmoid surface at an acute angle, and so, when the mandible is depressed, rotation takes place in such a way that the anterior portion of the mandible moves downwards, backwards, and outwards, thus allowing the gape to be opened to its fullest extent without dislocation of the bones.

The dentary presents an external and internal surface, a superior and an inferior edge. The bone is bent into two curves; the first portion is at right angles to the long axis of the head, the second is parallel to the long axis, at the same time having a small curve inwards so as to make the external surface concave.

The external surface runs backwards and bifurcates, enclosing the anterior extremity of the splenial. The greater portion of this surface is covered by the gland. A large mental foramen is placed close to the bifurcation.

From the inferior portion of the anterior third of the interior surface, there arises, in a well marked excavated surface, the genio-glossus muscle, and above this the genio-trachealis. Below the genio-glossus, and running along the inferior border, the intermandibular muscle arises.

The anterior extremity gives attachment to the intermandibular ligament.

The superior border contains about a dozen teeth. The inferior border gives attachment to the muscles as stated above.

OS PRÆFRONTALE VEL ANTEORBITALE.

Lachrymale vel Frontale anterius, D'Alton; Frontal antérieur, Cuvier; Ethmoidale laterale vel præfrontale, Gegenbaur, Harting, Wiedersheim; Prefrontale, Huxley; Præfrontale, Hoffmann; Thränenbein, Meckel; Frontale anterius vel Orbitale anterius, Joh. Müller, Owen; Præfrontale vel Ante-orbitale, Parker, Parker and Bettany; Frontale anterius vel Ethmoideum, Stannius; Thränenbein, Rathke.

The anterior orbital is an irregularly shaped bone resembling somewhat the letter Z, being composed of two horizontal and one vertical piece.

The superior horizontal bar presents a superior surface flattened internally, while externally there is a notch for articulation with the projection of bone from the frontal.

The notch is formed by an excavation which runs from above downwards and outwards, at the same time extending more posteriorly below than above. The internal portion of the inferior surface of the bone is flat, and gives attachment to the posterior portion of the nasal capsule, while the external portion rests on the pedicle of the bone.

The pedicle is prismatic in outline, its axis running from above downwards and outwards. The anterior surface is quadrilateral, smooth, convex, and sub-cutaneous. The posterior surface smooth with a large foramen at its lower edge, which leads to a canal that opens on the inferior surface. This transmits the lachrymal duct. This surface bounds the orbit anteriorly.

The internal side of the prism is mainly composed of membrane, so that a cavity is formed in the bone which is in relation with the nasal canal close to the posterior nares.

The inferior plate of bone is prismatic. The pedicle rests on the internal half of its superior sides, while the outer half of the plate helps to complete the antero-lateral portion of the orbit. The inferior surface is triangular in outline, the base of the triangle being internal. The inner portion of this surface is very slightly convex from before back, while the surface as a whole is slightly concave from side to side.

This bone shows at first sight a great difference to the corresponding bone of Morelia or any other python; the chief difference is in connection with the maxilla. The bone in Morelia occupies a more horizontal position, so that what was the anterior face of the pedicle in Acanthophis becomes the superior here; but, at the same time, the superior face is curved down, so that it becomes more or less antero-external, and it is the inferior border of this antero-external moiety that corresponds to the articular surface of the inferior horizontal plate in Acanthophis, a process forming the antero-lateral border of the orbit corresponding to the one described above. The posterior face presents a difference, in as much as it sends down processes which are united to the palatine, maxillary, and transverse bones by ligament. Owing to the horizontal position the internal border of the superior plate comes into contact with the nasals. The bones differ from those of Pseudechis and Daboia in the shape of the inferior horizontal plate. In these forms the inferior plate is convex, and forms a kind of ball and socket joint with the concave surface of the maxilla below.

OS MAXILLARE.

Maxillare superius, D'Alton, Cuvier; Maxillare, Gegenbaur, Hoffmann, Huxley, Owen, Parker, Parker and Bettany, Wiedersheim; Oberkiefer, supra-maxillare, Harting, Meckel, Joh. Müller, Stannius.

The maxilla is a crescent-shaped bone, convex externally, concave internally, and longer from before backwards than from side to side.

The superior surface is semilunar in outline, much wider in front than behind. Antero-internally it is slightly concave from before back. The inferior surface forms the alveolar margin which

carries one fang firmly fixed to the bone, while two accessory ones lie embedded in the mucous membrane immediately behind. On the posterior third of this margin there are three small permanently erect teeth. The anterior surface is smooth and convex, with a small depression over the fixed fang. Over this surface the venom duct runs to reach the fang. The external surface is the continuation of the anterior; it has a small groove for the venom duct to lie in. The internal surface presents two regions, an antero- and a postero-lateral, and between them a strong process. The anterolateral is the smaller of the two, and is formed by an excavation of the bone from above downwards and outwards; thus a concave surface is formed in which the palate bone fits. Behind this concavity the bone is produced downwards, inwards, and backwards, so that a prominent process is formed which lies on the palate, and is closely connected to that bone by ligament; the process also receives some of the fibres of the parieto-palatine muscle. The posterior two-thirds of this side is deeply excavated, forming the postero-lateral fossa. This is chiefly filled by the mucous membrane in which the accessory fangs lie.

The posterior extremity presents an articular surface consisting of a concave surface externally and a convex internally; it articulates with the transverse bone.

The bone differs from that of *Morelia*, in which the bone is long and prismatic-like, with all the teeth of nearly equal size. From *Daboia* it differs essentially in having the three solid teeth behind. It differs from *Diemenia* and *Pseudechis* only in the shape of the superior surface, which in these two forms is more concave so that the bone may move freely on the anterior orbital. Thus we see that this bone alone enables us to decide as to the classification of *Acanthophis*.

OS TRANSPALATINUM.

Pterygoideum externum, D'Alton, Harting; Transversum, Cuvier, Joh. Müller; Os transversum oder äusseres Flügelbein, Gegenbaur; Transversum, Hoffmann, Huxley, Wiedersheim; Hinteres Flügelstück, Meckel; Ektopterygoid, Owen, Stannius; Transpalatinum, Parker, Parker and Bettany.

The transpalatine is an irregularly shaped bone, about half the length of the pterygoid. Viewed from above it is seen to be convex externally; viewed from the side the anterior half is so curved that the convexity is above. The anterior extremity is flattened from above downwards, and presents an articular head for the maxilla, the external portion being convex, the internal concave. The superior surface is convex, while a deep fossa occurs on the inferior. To the superior surface is attached a well marked band of fascia running from the postorbital bone above, which serves to bound the orbit, suspend the transpalatinum and limit its anterior movement, and lastly to form a floor for portion of the venom gland to rest on. At the junction of the anterior with the posterior half of the inferior surface, there springs a strong recurved process. To this, as well as to the posterior half of the inferior surface, the lower head of the internal pterygoid muscle is attached. The posterior extremity, as well as portion of the internal surface, articulates with the pterygoid bone.

The chief point in connection with this bone is the prominent recurved process of the inferior surface. In some lizards we have observed a somewhat similar process. It is also to be observed that the insertion of the pterygoid muscle into this bone is one of the reasons for considering that *Acanthophis* is far removed from the vipers.

OS PTERYGOIDEUM.

Pterygoideum externum, D'Alton, Harting; Pterygoid, Cuvier, Gegenbaur, Huxley, Hoffmann, Joh. Müller, Owen, Parker, Parker and Bettany, Stannius, Rathke, Wiedersheim; Vorderes Flügelstück des Keilbeins, Meckel.

The pterygoid is a scimitar-shaped bone, and thrice as long as the palatine. The anterior third is prism-shaped with its external side slightly convex, while the posterior two-thirds is flattened from above downwards, with a well marked concavity externally. The superior surface of the anterior portion of the bone gives insertion to a few fibres from the parieto-palatine muscle. The inferior surface is the alveolar border supporting a number of small recurved teeth. The anterior extremity articulates with the palate by a ginglymus joint. The posterior two-thirds of the bone is twisted on its long axis, so that the interior surface comes to lie internally, and slopes from above, downwards and inwards. To this surface is attached the pterygo-sphenoid muscle, while the parieto-pterygoid is inserted on the external border. The transverse joins the bone at the junction of the anterior with the middle half of the external border. The inferior surface is deeply excavated, and gives attachment to the internal pterygoid muscle; while a number of small teeth spring from the inner border of the surface.

The posterior extremity of the bone comes to a point, from which a ligament springs which connects the bone with the inner side of the articular. This connection is not an intimate one, and we can find no such arrangement of the extremity of the pterygoid, such as Huxley has described in *Crotalus*. This point will be dealt with below.

OS PALATINUM.

Os Palatinum, all authors.

The palatine is a prism-shaped bone slightly longer than the maxilla. In the posterior half of its upper border is attached the parieto-palatine muscle. To the middle of this border the maxilla is attached by ligament. The inferior border carries five solid teeth almost the same size as those on the posterior part of the maxilla. The external border fits into the groove on the antero-lateral surface of the maxilla. The posterior extremity articulates by a ginglymus joint with the pterygoid.

The bone differs but slightly in any of the forms examined.

HYOID BONES.

The osseous portions of the hyoid bones are represented by two thin bars which run forward on either side of the posterior portion of the tongue. They end at about an inch from the symphysis of the mandibles by converging towards the mid-line, and then coalescing below the tongue. They are hidden from view by the costo-mandibular muscles attached to their inferior surfaces, while the mylohyoid arises from them anteriorly, and the hyoglossi are attached along their internal borders. The genio-hyoglossi are inserted into their anterior portions, and the hyo-trachealis arises from the same region.

The length of the bars varies in the various species examined, being about $1\frac{1}{2}$ inch in *Acanthophis*, but about 3 inches in both *Pseudechis* and *Diemenia*, so that the hyoglossi in these species do not arise from the whole length of the bones, but only from the anterior half, while posteriorly there is a special interhyal muscle developed. These bars are taken by previous writers to represent the ceratohyals of other groups.

In Daboia, and, to a less degree, in Acanthophis and Pseudechis, there is an arrangement which appears to throw light upon the true homology of these parts. The osseous bars run forward and converge to the mid-line, where they fuse with a small plate of cartilage (?). From either side of this plate there run out two well-marked tendinous bands which intersect the mylohyoid and the costo-mandibular muscles. Each band runs a little forward and outwards, and then turning sharply runs backwards and outwards, and is lost at the posterior extremity of the mandible. Thus we have a hyoid apparatus very similar to that described and figured by Parker for Lacerta agilis, and also like what we find in Hinulia.

Taking this view of the hyoid apparatus, we consider that the anterior intersections represent the hypohyal, and ceratohyal; the stylohyal we have seen to be attached to the quadrate. The plate at the junction of the two osseous bars will therefore be the basihyal.

The second intersection will be the first branchial bar, while the two ossified rods usually considered to be ceratohyals will be the hypobranchial bars.

The Vertebral Column.

The vertebral column of ophidians is generally divided into two regions, a costal and a caudal. Rochebrune has, however, gone very fully into the subject of the vertebræ of snakes, and he distinguishes five regions, cervical, thoracic, pelvic, sacral, and coccygeal or caudal.

The cervical vertebræ are two in number, and are devoid of ribs; they represent the atlas and axis. The thoracic and pelvic vertebræ have ribs, with ossified processes anchylosed to their lateral aspects. The caudal are distinguished by possessing a bifid hypapophysis. The only difficulty that arises is in distinguishing the thoracic vertebræ from the pelvic. The thoracic possess hypapophyses without exception; the pelvic in certain forms only. When, therefore, both regions have hypapophyses Rochebrune distinguishes between them thus:—

"Thoracic.—Brièveté relative du corps, surélévation et inclinaison des lames, abaissement brusque et raccourcissement des processus, direction oblique du tenon, position élevée des tubercules costaux; développement exagéré des apophyses épineuses supérieures et inférieures; largeur de la partie supérieure du trou rachidien."

"Pelvic.—Epaisseur et longueur relative du corps; aplatissement et écartement des lames; amincissement et relèvement de l'extrémité des processus; direction droite du tenon; position en dessous des tubercules costaux; développement des apophyses transverses; brièveté et largeur relatives de l'apophyse épineuse; brièveté et inclinaison de l'hypapophyse; aplatissement de la partie supérieure du trou rachidien."

Taking a thoracic vertebra we shall compare the vertebræ of the other regions with it.

Centrum: The centra are proceedous. The articular faces are ellipsoidal, the long axis being transverse. The edge of the "socket" is slightly concave above and below, the appearance

being caused by the lateral portions projecting more forward. This has reference to the fact that the vertebræ generally move in the transverse and not in the vertical plane. The "ball" of the posterior articular surface is almost a hemisphere. On looking at the surface in profile the curve of the upper third of the ball is seen to be the circumference of a smaller circle than the lower two-thirds, while the lateral portions of the rim are produced forward so as to correspond with the lateral edges of the socket.

The centrum as a whole is somewhat pyramidal, the base being posterior. The base slopes from above downwards and backwards, and it is upon this surface that the "ball" of the posterior articular surface rests. It follows from this that the axis of the posterior face, instead of corresponding with the axis of the centrum, makes an angle of about thirty degrees with the long axis of the body. The advantage of this will be seen hereafter.

The anterior portion of the centrum corresponding to the apex of the pyramid bears the concave anterior articular face. The dorso-ventral axis of this face is inclined from before, downwards, and backwards. Owing to this the lower three-fifths of the socket rests on the front of the pyramid, while the upper two-fifths is free, and inclines forward. The reason for this becomes evident when we take a longitudinal vertical section of two vertebræ; we then see that the superior part of the cup rests on the upper and most curved portion of the ball, while the lower three-fifths rests on the less curved portion of the ball. We thus have a ball and socket joint, the dorso-ventral axis of which is downwards and backwards, and thus is formed a joint capable of withstanding greater force from above downwards than if the axis of the ball and socket was parallel to the long axis of the body.

From the anterior portion of the external surface the diapophysis and parapophysis spring; while from the inferior surface a strong recurved hypapophysis projects. On each side of the base of the hypapophysis are seen two excavations from which the levatores costarum interni spring. The superior surface forms the floor of the neural canal.

Pedicles: The pedicles arise from the lateral portion of the superior surface of the centrum. They are very short anteriorly, but longer behind, and run upwards and slightly outwards. The external surface is grooved for the subvertebral rectus muscle, while anteriorly the buttress of bone supporting the prezygapophysis springs from its side. The anterior and posterior edges are indented forming portions of intervertebral notches for the exit of the spinal nerves. Where the posterior portion of the pedicle joins the lamina the postzygapophysis is given off.

Laminæ: The laminæ run upwards and inwards from the pedicles to the mid-line; at the same time they are produced forwards and backwards to form the zygosphene and zygantrum respectively. The external surface of the lamina is excavated for the rotatores dorsi muscles. The anterior edge is taken up by the zygosphene; the posterior is well marked and runs outwards into the posterior edge of the first zygapophysis, while it is continued internally into the neural spine.

Neural spine: The neural spine springs from the junction of the laminæ in the mid-line. It is quadrilateral in outline. The edge is sharp, and the tendons of the spinalis dorsi are inserted on it. The anterior edge is likewise sharp, and gives attachment to the interspinales. The posterior edge is marked by an excavation in which the interspinales lie. The lateral sides of the spine are broad and smooth, and from here the spinalis dorsi and multifidus spinæ arise, the former above, the latter below.

Zygosphene: The zygosphene projects from the anterior borders of the lamine as a well marked process. The superior surface is convex, and gives attachment to a strong ligament which helps to bind the vertebre together. The lateral surfaces are bevelled from above, downwards and backwards, forming facets for articulation with the preceding zygantrum.

Zyantrum: The zyantrum is formed by the expansion of the laminæ posteriorly. It presents two facets, which will be understood by supposing a pyramidal piece to be excavated from the

internal face of the posterior portions of the diverging laminæ. The excavation is made from above downwards and outwards, but the floor runs downwards, inwards and backwards. Into this niche on either side a facet of the zygosphene fits, "like the joints called tenon-and-mortice in carpentry" (Owen).

Prezygapophysis: The prezygapophysis is supported on a pedicle of bones that runs upwards from the diapophysis. The articular face looks upwards, is oval, with a process from its anterior border. It runs downwards, inwards, and backwards. It articulates with the posterior zygapophysis of the preceding vertebra. The pedicle that supports the zygapophysis sends up a well-marked process external to the articular facet. This we consider to be a metapophysis. It gives attachment to the levatores costarum, longissimus, and intertransversarii muscles.

Postzygapophysis: The postzygapophysis is not so strongly built as the anterior, the reason being that the anterior is the supporting zygapophysis.

The articular facet is situated on the inferior surface, and consequently looks downwards, while at the same time it runs inwards, forwards, and slightly upwards, a small projection proceeding backwards from its posterior edge.

The superior surface of the zygapophysis is flattened, and is continuous with the external surface of the lamina. To this is attached the semispinalis.

Transverse Process: The transverse process is represented by a small projection of bone from the external side of the anterior portion of the centrum. On this projection an articular face is developed which is made up of two tubercles. The superior tubercle projects outwards, is rounded, convex, and more posterior than the inferior, which is oval, slightly convex, and larger than the superior. Between the two tubercles there is a depression, concave from above downwards. The axis of the whole articular face is downwards and forwards. Leading from the inferior

tubercle is a small pedicle of bone; this runs forward and downwards, and is regarded by Owen as representing a parapophysis.

Hypapophysis: The hypapophysis springs from the whole of the inferior edge of the centrum. It runs downwards and backwards. Its anterior edge is longer than its posterior, and slightly concave from above downwards. The external sides are rounded, and give attachment to the depressores costarum and subvertebral rectus.

Atlas: The atlas presents as in all vertebrates the most considerable modifications. The anterior face has three articular facets, while occupying the region of the centrum is the elliptical prominence of the anterior extremity of the odontoid process. Anteriorly and inferiorly this latter slopes rapidly downwards and backwards, while superiorly it extends upwards and backwards for a short distance only. On either side it meets the lateral facets of the atlas at an acute angle. These facets, which represent the articular surfaces of the lateral masses, spread out from the odontoid process like wings; they are triangular (the apex being superior) and concave. Each plate is placed so that its surface slopes downwards, backwards, and inwards, to meet the odontoid process, and thus, as mentioned above, an acute angle is formed on either side. The facets articulate with the exoccipital moieties of the trefoil condyle of the skull. The third face is the superior surface of the autogenous hypapophyseal portion of the bone. is pentagonal in shape, the apex being in front. The surface is concave and lies anterior though inferior to the odontoid process, which it meets behind, making with it an angle of 60°. The anterior portion of this face presents a distinct ridge, which enables the occipital condyle to hook on most effectually. The neural arch is formed by two curved laminæ of bone running up to meet in the mid-line, the neural canal being wider, though less high, than in other regions. The neural spine is absent, a slight ridge taking its place. There is no prezygapophysis or zygosphene; the anterior superior edge being, however, in close relation to the posterior superior edge of the exoccipitals. A small prezygapophysis is

present, but no facets for a zygantrum, the posterior border projecting slightly over the axis, which has no zygosphene. Two small tubercles project from a weakly developed transverse process. The hypapophyseal region consists of a wedge-shaped piece of bone, the anterior portion of the superior surface of which was described above. It articulates with the inferior surface of the basioccipital portion of the condyle of the skull; it is also in contact with the odontoid process, and with the hypapophysis of the axis. A suture shows its autogenous separation from the atlas upon which it is freely movable.

The posterior articular surface of the bone presents two concave lateral facets, and a concave inferior facet. These all articulate with surfaces on the axis.

The various elements fit on to the occipital condyle in the following manner. The superior portion of the tubercle carries ligaments, while the anterior and inferior part fits into the V cleft formed by the exoccipitals on either side, and the basioccipital below. The lateral concave wings fit on the exoccipital; the small convex portion mentioned above fits in between the latter bone and the basioccipital. On the surface of the concave pentagonal plate of the hypapophysis, the convex surface of the basioccipital rests; and since the inferior edge of this bone is produced into a hook-like process, this fits into the ridge of this pentagonal plate.

Thus it can be seen that lateral movement of the head can take place to a degree; while upward movement is rendered almost impossible by the close apposition of the bones. On the other hand downward movement can take place to a considerable degree.

Axis: The odontoid process is represented by a sub-conical projection proceeding forward from the centrum. Three articular facets surround its base, the upper ones articulating with the lateral surfaces of the atlas, the inferior with the hypapophysis. The pedicles are short and straight, while the laminæ are quadrilateral, their antero-posterior and lateral measurements being equal. The neural spine is short and conical, and the neural canal is more

rounded than in the case of the atlas. There is a weakly developed anterior zygapophysis and a well developed posterior one. A short recurved spike of bone, springing from the transverse process, is in serial homology with the ribs. The anterior surfaces of the laminæ are not formed into a zygosphene, but there is a zygantrum developed posteriorly. The hypapophysis presents a reduplicated arrangement, for closely united to the hypapophysis of the atlas is seen a small process of bone separated by a suture from the odontoid above. This is followed immediately by a well marked recurved spine, the true hypapophysis. The anterior of the two processes appears in all the snakes examined, and is also well developed in Grammatophora; while in the atlas of man a well marked nodule of bone may be sometimes observed in this situation. The third vertebra was remarkable in having no ribs attached to it; a small process of bone, anchylosed to the transverse process, being the only representative of a rib.

On considering the spinal column as a whole, we find that it is composed of two pyramids placed with their bases opposed to one another. In this it agrees with the observations of M. Rochebrune, who says, after examining a great number of skeletons of snakes, "On observe que l'axe osseux est formé de deux pyramides étroites sensiblement pentagonales, opposées par leur base la plus large, plus au moins longues en raison des os qu'elles renferment, et dont la première depasse rarement les trois huitièmes de la longueur totale du corps." The vertebræ number about 175; the exact number is difficult to ascertain, since the last fifteen are but thin leaves of bone. Of this number 124 vertebræ bear ribs.

The only points to be noted in connection with the first ten vertebræ are that they are relatively small, and that the neural spine, instead of springing from the whole line of junction of the laminæ, arises from the posterior portion only, and running upwards is constricted so that it appears somewhat hour-glass shaped when viewed from the side.

The hypapophysis is also longer and less oblique, and at the same time weaker than it is more posteriorly. Gradually, as we

continue back, we find the neural spine becoming broader anteroposteriorly, while the hypapophysis becomes shorter, and slopes downwards and backwards. The vertebræ as a whole become more stoutly made until we reach the fiftieth, which constitutes the base of the anterior pyramid. From this onwards we have the vertebræ decreasing in size, the neural spines becoming shorter, and springing from the whole length of the line of junction of the laminæ, while the hypapophyses also become shorter and more pointed. At the 126th vertebra we have the ribs ceasing, and in their place we now get two processes the exact nature of which has caused much discussion.

If we examine the vertebræ from this point to the 132nd we shall find that these processes spring from the transverse processes, the superior one arising from the upper tubercle, the inferior from the lower tubercle. A few vertebræ further back we have the superior process disappearing, and represented by a small projection only, from the surface of the inferior one; the appearance presented being similar to the letter \prec . Still further back the superior process disappears entirely. At the vertebra where the ribs cease we have frequently a well-marked rod of bone, anchylosed to the superior portion of the rib, and freely movable by its inner extremity on the superior tubercle of the transverse process. This occupies such a position as the superior of the two processes mentioned above. It is to be noted that when this occurs we do not find the tubercle of the rib present.

Many conjectures have been hazarded as to the real nature of these processes. Rochebrune says, "Contrairement à l'opinion de Meckel ces apophyses ne sont pas dues à une bifurcation de la côte, la superieure est constituée par la pleurapophyse modifiée et soudée au centrum; l'inferieure est due au développement exagéré de la parapophyse, interprétation vers laquelle penche R. Owen." Owen says, "The diapophyses become much longer in the caudal vertebræ and support in the anterior ones short ribs, which usually become anchylosed to their extremities." Hoffmann says, "Ganz eigenthümlich ist die Erscheinung, dass wort wo die

præsacralen Wirbel in die postsacralen übergehen, die Rippen und die Processus costo-transversarii eine Gabelbildung zum Schutz der Lymphherzen bilden. Salle, welcher sich mit ihrem Bau ausführlicher beschäftigt hat, nennt dieselben, "Lymphapophysen," und je nachdem die Gabelbildung an den Rippen oder an den Processus costo-transversarii (Querfortsätz, Salle) vorkommt "costale" oder transversale costo-transversale." And again, "Was die Entwickelungsgeschichte der Lymphapophysen angeht, so theilt Salle mit, dass beide Schenkel gleichzeitig von einer gemeinsamen Basis auswachsen, Knorpelig angelegt werden und später ossificiren." In endeavouring to account for the homology of the parts we are met with this difficulty. If we take Salle's observation as correct, both processes spring from the one point, then the process that is in connection with ribs must either represent both processes coalesced into one and differentiated off from the vertebræ, or else it contains only the representative of one of the processes; or thirdly, that it has no connection with either of the posterior elements. If we were to suppose that the rib was an outgrowth from the side of the vertebra, our difficulty would then vanish, for we would then have two processes springing from the vertebra in each case, but being differentiated off in the one instance, and remaining attached in the other. To this it must be said that all late investigations tend to show that the ribs are not an outgrowth from the vertebræ, but are formed quite independently. The question arises, can even development prove the homology of the process attached to the ribs? We doubt if it could; for were it to be shown that the process arose independently of the vertebra, then the objection remains that the posterior ones are outgrowths from the vertebræ. And if, on the other hand, the process arises as an outgrowth like the posterior one, then which of the two does it represent?

The fact seems to be clear, that, as regards the actual position of the two processes, the superior corresponds to the detached process connected with the rib, while the inferior corresponds to the rib itself. If this be so then we think that the following statement by Flower may throw some light on the subject:—

"There can be no doubt, but that an autogenous process of one vertebra of an animal may be serially represented by an exogenous process in another vertebra of the same animal; and likewise that the corresponding processes of the same vertebra may be developed exogenously in one animal and autogenously in another."

In dealing with the prezygapophysis above, we suggested that the process connected with it might represent a metapophysis, and we now suggest that the superior of the two processes may be an anapophysis, while the inferior may represent the lumbar transverse process of higher animals.

From the 133rd vertebra to the end we have considerable alterations. The elements of the vertebra begin to diminish in size, and at the same time the hypapophysis becomes bifid. Rapidly the processes become less conspicuous, so that when we reach the last fifteen vertebra we find a neural arch formed by the diminutive lamina supporting a thin perpendicular spine, while inferiorly the hypapophysis is represented by two small spicules of bone only.

In comparing the vertebral column of Acanthophis with that of Pseudechis and Diemenia, we see no very marked difference. The processes from the prezygapophysis are more conspicuous, and the neural spines are not so high in these two forms. The greatest dissimilarity exists in regard to the tail vertebre which are more stoutly made, and exhibit the same processes as the anterior, only less well developed. As compared with Morelia the zygantrum of the latter is much more excavated, the articular surfaces on either side being separated anteriorly only by a slight ridge of bone in the mid-line. In the second place there are no processes (metapophysis?) springing from the prezygapophysis, a slight ridge-below the articular head being the only representative; neither are there any inferior processes from the lower portion of the transverse processes.

Perhaps the most striking difference arises in the connection with the hypapophysis. In all venomous snakes that we have examined there is a well-developed hypapophysis on all the vertebræ that bear ribs, but in non-venomous forms the hypapophyses cease to be developed at a variable distance from the anterior extremity. In the following table we show how variable the processes are:—

	Vertebræ.	Ribs.	Hypapophyses.
Morelia	363	273	78
Python sp	340	259	. 69
Zamensis carbonarius	310	195	38
Boa constrictor	305	?	60
Python tigris	291	251	74
Deurodon scaber	256	?	32
Crotalus horridus	194	168	194
Acanthophis	175	124	175

Soon after the ribs cease the hypapophyses again appear, but in a bifid form. The nature of the hypapophysis has called forth much discussion, and Rochebrune has made the following remarks concerning the subject:—

"Les anatomistes attribuent à l'hypapophyse un rôle importan, dans le mécanisme des mouvements, et tout en la considérant comme destinée à servir d'attache aux muscles fléchisseurs du tronct ils n'hesitent pas à voir en elle un obstacle à la flexion du corps en dedans. . . . Pour faire voir que l'influence de l'hypapophyse, comme obstacle à la flexion en avant, est de nul effet, il suffit de renvoyer à ce qui à été dit au sujet des espèces dendrophyles, à longues hypapophyses malgré leur mobilité excessive, et aux descriptions des hypapophyses longues, droites et minces des genres Python, Boa, etc." Rochebrune then goes on to say that he considers them of only secondary importance as regards muscular attachment. He supposes that the hypapophyses play an important part in the ingestion of the prey. "La longuer de la ligne hypapophysaire dépasse rarement celle de l'œsophage et de l'estomac; l'une et l'autre sont en rapports directs, de telle sorte qu'à l'inspection d'une colonne rachidienne, il est possible de determiner l'étendue des deux organes." He sums up by saving, "Les hypapophyses nous semblent donc être destinées, tout particulièrement, à maintenir le bol alimentaire pendant les contractions que nécessite l'acte de la déglutition, et à faciliter son cheminement à travers le canal alimentaire."

After examining the subject attentively we certainly reject the suggestion of Rochebrune with regard to the processes hindering the regurgitation of the food. We do not hesitate to say, that had such been the case "selection" would in time have brought about a much more efficient mechanism than at present exists in the poorly developed hypapophyses of non-venomous snakes. In Deurodon alone have we not an example of how efficiently "selection" will act when called upon? We prefer to adhere to the view that the hypapophyses are developed to give attachment to muscles. The question therefore arises, why should the hypapophyses disappear in some species and not in others? The only explanation we can give is that the hypapophyses are developed not only in snakes, but also in the higher animals in the cervical and caudal regions, while less commonly in the lumbar region; and that along with the appearance of the hypapophyses we have well marked hypaxial muscles developed. In the snake, while the hypaxial muscles are developed throughout the whole column, yet we have anteriorly the conspicuous bundles of the rectus capitis group calling for much more extensive bony attachment than could be afforded by the vertebræ without hypapophyses. In the venomous snakes we find that the hypaxial muscular bundles do not flatten out as in the non-venomous species, and this may be the reason why we should always find greater processes. And going a step further we say that the muscles remain more rounded in order to act most efficiently, by aiding the rapid movements which characterise venomous snakes.

THE RIBS.

The rib consists of a shaft and two extremities. The inner or vertebral extremity presents for examination an articular surface and a well marked process. The articular face is reniform, the concavity being anterior. Its superior portion is concave, and articulates with the upper facet of the transverse process of the

vertebra, while its inferior portion is slightly convex, and glides over the surface between the two facets of the transverse process. The process springs from the upper portion of the extremity, and is continuous with the posterior surface of the shaft. It runs upwards and backwards, and gives attachment to the innermost bundles of the external intercostal muscles; while the superior vertebro-costal ligament, running forwards and outwards round the superior surface of this process, thus prevents rotation forward of the upper and inner portion of the rib.

The Shaft: The shaft is prismatic in shape and presents an anterior, posterior, and inferior surface, together with three borders.

Anterior surface: To the upper portion of the inner third of the anterior surface are attached the levatores costarum externi; while to the lower portion of this inner third and to the whole of the outer two-thirds are attached the external intercostals.

Posterior surface: The posterior surface, (which if continued internally would end in the process described above) gives attachment to the external intercostals.

Inferior surface: The inferior surface is more rounded than the preceding ones, but it is not well defined from the posterior surface, except internally. The external intercostals arise from here as well as from the posterior surface.

There are three borders, a superior, anterior, and posterior.

Superior border: The accessory portion of the sacro-lumbalis column arises at the junction of the inner two-fifths with the outer three-fifths; while immediately external to this we have the sacro-lumbalis inserted, and the pretrahentes costarum superiores, and the external oblique arising. The pretrahentes superiores cover the middle third, and are inserted at the junction of this with the outer third over which the pretrahentes inferiores run.

Anterior border: The anterior border when followed inwards is seen to end in a tuberosity which gives attachment to the levatores costarum interni, and the inferior vertebro-costal ligament. The outer third of this border gives origin to the retrahentes costarum.

Posterior border: The posterior border gives insertion to the depressores costarum. At its middle point, and just external to this, we have the origin of the transverse muscle, and still more external the insertion of the retrahentes costarum. The external extremity gives attachment to the costal cartilages, which give origin to the internal oblique, and the antero-posteriorly directed fibres of the external intercostal muscles.

MYOLOGY.

Muscles of the Head.

On the integument being reflected from the cephalic region the muscles of the head are displayed covered only by a delicate fascia, which runs forward to be lost on the frontal bones. In the mid-line the greater portion of the median triangle of the parietal bone is to be seen uncovered by muscle. On either side anteriorly lie the masseters resting on the venom gland beneath, and covering the anterior, and portion of the posterior, temporal muscles. Posteriorly the quadrilateral-shaped digastric runs outwards and backwards to the extremity of the mandible, where it is covered by the fibres of the retractor oris as they run from the neural spines downwards and forwards to end at the symphysis of the lips. Inserted on to the supraoccipital is seen the spinalis dorsi, while on the exoccipital of either side is the complexus. Posterior to the retractor oris the depressor mandibulæ springs, and runs forward and downwards to merge into the mylohyoid between the mandibles below.

MASSETER.

M. parietali-quadrato-mandibularis (seine vordere Portion), Hoffmann; Schliesser des Mauls oder Beissmuskeln, Hübner; Der grosse Beiss- oder Shlüfenmuskeln (seine vordere Portion), D'Alton; M. temporalis, von Teutleben; Masseter, Owen; Temporalis anterior, Duvernoy, R. Jones.

The masseter arises from the lower two-thirds of the external surface of the postorbital bone, and from the upper portion of the lateral triangle on the superior surface of the parietal. The muscle is in two parts. The superior or superficial portion arises mainly from the parietal, and its fibres run downwards and backwards to become inserted by a tendon on the posterior part of the superior surface of the capsule of the venom gland; at the same time some of the fibres are inserted more anteriorly. The deeper portion of the muscle arises in great part from the postorbital, and runs downwards and backwards to form the internal fibres of a band of muscle which arises from the internal aspect of the capsule of the gland. The muscle turns round the commissure of the lips, and runs forward to be inserted on to the anterior two-fifths of the external surface of the articular moiety of the mandible, immediately behind the dentary.

The muscle is thus seen to be composed of three portions, and in this respect it agrees with the description given by Duvernoy (5) of Naja and Bungarus. In Pseudechis and Diemenia the arrangement is very similar, there being, however, more muscular fibres inserted on the gland anteriorly. In Morelia the upper portion of the muscle is represented, its fibres run downwards and backwards, and end in a tendinous expansion which is inserted on the mandible for a short distance. The muscle is, in this latter snake, and the same seems to hold good for all the Colubridæ, in relation with the large lachrymal gland, and gives fibres to it to form a special compressor. D'Alton describes this muscle as arising by two heads in Python bivittatus.

In *Daboia* the masseter is but slightly attached to the parietal bone; it arises chiefly from the superior surface of the capsule of the gland, and runs downwards and backwards so as to be more posterior to the gland than in the *Elapida*. This seems to be the typical manner of origin of the masseter in vipers.

Posteriorly the masseter is related to the posterior temporal muscle, while on reflecting it the anterior and deep temporal come into view together with branches of the fifth nerve, one of which supplies the muscle. The muscle acts as an elevator of the mandible and compressor of the venom gland, and of the lachrymal gland in colubrine snakes.

M. TEMPORALIS ANTERIOR.

Zweite mittlere Portion of No. 1, D'Alton, Hoffmann; M. temporalis, Owen; Middle temporal, Duvernoy, R. Jones.

The anterior temporal arises from the outer portion of the lateral triangle of the parietal, and from a small part of the superior surface of the prootic. The anterior fibres running backwards and the posterior forwards, meet, and together they descend over the rounded anterior portion of the squamosal, and running back are inserted into the superior edge of the middle third of the mandible above and behind the insertion of the masseter.

The muscle is well developed and of considerable size in Acanthophis, Diemenia, and Pseudechis; while in Morelia it is a very powerful muscle, occupying a great portion of the postorbital fossa. In Daboia it is however of small size, and is represented by a band of muscle which arises from the side of the parietal, and running outwards and downwards comes to be anterior and external to the insertion of the masseter.

The anterior temporal is covered by the masseter and part of the venom gland, while it is closely related to the branches of the third division of the fifth nerve, which emerge far under its anterior border. Behind it is closely related to the posterior temporal and external pterygoid, while internally it covers in the parieto-pterygoid and parieto-palatine muscles. It is supplied by the fifth nerve.

Its action is to raise the mandible; in *Python* it is the chief muscle in this action. It depresses the cranium when the mandible is fixed.

M. TEMPORALIS POSTERIOR.

Dritte Portion of No. 1, D'Alton, Hoffmann; Posterior temporal, Owen, Duvernoy, R. Jones.

The posterior temporal arises from the upper three-fourths of the external surface and edge of the quadrate. Its fibres run downwards and forwards to be inserted into the ridge, and the excavated area on the middle third of the external surface of the surangular plate of the mandible, having the insertions of the masseter and anterior temporal anteriorly, and the mylohyoid inferiorly. The muscle is related to the digastic posteriorly, while some fibres of the retractor oris spread over it externally. Internally the muscle hides from view the external pterygoid.

The muscle differs but slightly in all the forms examined. It is supplied by the fifth nerve. Its action is to raise the mandible, or when the latter is fixed to depress the cranium.

M. PARIETO-MANDIBULARIS (muscle of the epipterygoid bone).

Die vierte Portion of No. 1, Hoffmann, D'Alton.

On reflecting the masseter and pushing aside the venom gland, a thin rounded muscle is observed lying in front of the anterior temporal muscle. It arises from the prominent projection at the junction of the middle-lateral with the posterior-lateral edge of the parietal bone. It runs downwards and backwards to be inserted on a small area of the upper portion of the middle third of the internal surface of the mandible. The muscle was described by D'Alton, who took it to be a portion of the temporal muscle (tiefste Portion). Hoffmann has likewise described it as portion of the temporal. An important relation is established by a large branch of the third part of the fifth nerve, which emerging from under cover of the anterior temporal muscle winds round this muscle, and separates it from the temporal group.

In Hydrosaurus a similar muscle is present, springing from the parietal, and the superior portion of the epipterygoid (columella) and being inserted on to the mandible. The nerve has the same relation to it as in the snakes. The muscle appears in all the snakes examined, and Sanders (No. 25), has described a muscle similar to this in Platydactylus and Liolepis. He however says that the muscle is inserted into the pterygoid bone; this we think is a mistaken observation. He suggests that the muscle corresponds to the tensor tympani, but we are at a loss to see on what ground he could found his homology. It may belong to the temporal group, but the relation of the nerve to it forms an obstacle to its being considered so. On the other hand it is supplied by the third division of the fifth nerve.

It is interesting to find this muscle in the ophidians from its relation to the columella in the lacertilians, since we see the bone disappearing, but the muscle remaining to aid as an elevator of the mandible.

M. PTERYGOIDEUS EXTERNUS.

Part of posterior temporal, Hoffmann, D'Alton, Owen, Jones, Duvernoy.

On the posterior temporal muscle being removed, the fibres of the external pterygoid are displayed, arising from the whole of the anterior edge and part of the internal surface of the quadrate; the muscle runs downwards to be inserted into the whole of the mandibular fossa. The muscle is separated from the posterior temporal by fascia, and by the inferior dental nerve which winds round its anterior edge to gain the external surface, where it runs to enter the foramen on the mandibular fossa. The muscles presented no differences in any of the snakes examined. The muscle is usually regarded as part of the posterior temporal, and no previous observer has described it as being at all separated from the posterior temporal. Whatever be the proper homologue of this muscle it must certainly be described as being quite distinct from the posterior temporal. We think it approaches more closely to the external pterygoid than the muscle usually described under that name. is supplied by the third division of the fifth nerve.

M. PTERYGOIDEUS INTERNUS.

M. tranverso-maxillo-pterygomandibularis, Hoffmann; Aeussere Flügelmuskel, D'Alton; Pterygoideus externus, von Teutleben; Pterygoideus externus et internus, Duvernoy and R. Jones; M. ektopterygoideus et M. entopterygoideus, Owen.

The internal pterygoid arises by two heads. The external or inferior head springs from the lower portion of the external surface of the posterior two-thirds of the mandible. The inner head arises from the lower part of the posterior third of the inner face of the mandible, and from the capsule of the quadrato-mandibular joint, and from the inferior extremity of the quadrate bone. The

two heads coalesce into a rounded belly of muscle which runs forward and downwards, the lowermost fibres being inserted on to a special process in the middle of the inferior surface of the transverse bone, and also into the posterior half of that bone. The upper fibres, (or those that mainly spring from the internal surface of the mandible), are inserted into the inferior surface of the posterior half of the pterygoid bone. The muscle at its origin has the digastric above it externally, while the spheno-pterygoid lies on the internal face. Inferiorly the muscle is completely covered by the mylohyoid.

The muscle is usually described as two, i.e., the external and internal pterygoids. We have carefully dissected several forms to ascertain if there are any grounds for this separation, and we find that the separation into two muscles is quite unnecessary. The same holds good for *Hydrosaurus*. We may also add that the same nerve supplies both parts of the muscle.

In Daboia and in all vipers the muscle is prolonged forward so as to be inserted into the maxilla, and at the same time sending a tendon to act on the mucous membrane that covers the fangs. This arrangement of the pterygoid muscle forms a valuable means of distinguishing the vipers from the venomous colubrine snakes. The insertion of the muscle in Acanthophis into a special process on the transverse bones is interesting, as a similar process for its insertion is seen in Hydrosaurus.

M. DIGASTRICUS (Posterior belly).

M. occipito-quadrato-mandibularis, Hoffmann; Niederzieher des Unterkiefers, D'Alton; M. temporalis, von Teutleben; M. tympano-manibularis, Owen; M. digastricus, R. Jones, Duvernoy.

The digastric arises by two distinct portions. The smaller one springs from the ridge between the supraoccipital and the epiotic bones, and from the posterior third of the superior surface of the squamosal; the larger portion arises from the posterior surface of the quadrate, and from the capsule of the joint between the quadrate and the squamosal. The bellies coalesce above and run

downwards and backwards to be inserted into the whole of the triangular area on the upper surface of the articular, immediately behind the quadrato-mandibular articulation. The two bellies are more distinct in *Morelia*. They also appear to be well marked in *Crotalus durissus* as figured by Duvernoy.

The muscle is supplied by the seventh nerve.

Its lower portion is covered externally by the fibres of the retractor oris. It is the chief muscle in opening the mouth of the snake, since it acts on the posterior extremity of the mandible, raising it and so depressing the anterior portion.

M. PTERYGO-SPHENOIDALIS (Levator palati).

M. pterygo-sphenoidalis posterior, Hoffmann; Innere hintere Flügelmuskel, D'Alton; Spheno-pterygoid, Duvernoy, R. Jones; Prespheno-pterygoideus, Owen.

The pterygo-sphenoidalis arises from the lateral surface of the parasphenoid bone as a narrow strip of muscle; this runs backwards and is continuous with a broader belly which arises from a special excavation on the basisphenoid, close to the median line. The muscle runs downwards, backwards, and outwards to be inserted on the superior surface of the posterior half of the pterygoid bone. At its origin the muscle has the spheno-vomerine muscle lying externally, while the parieto pterygoid lies externally at its insertion. The muscle is hidden from view by the aponeurosis that covers the roof of the mouth.

According to Owen it represents the levator tympani of fishes. We, however, regard it as the levator palati for the reasons given below.

The muscle is one of the most powerful of the head group, and is the chief protractor of the pterygoid bone, and hence the chief erector of the fang.

M. PTERYGO-PARIETALIS. (Part of tensor palati).

M. pterygo-parietalis, Hoffmann; Der Hebemuskel des inneren Flügelbeins, D'Alton; M. orbitalis, Hübner; M. post-orbito-palatine, R. Jones; not mentioned by Owen.

The pterygo-parietalis arises from the anterior portion of the postero-lateral edge of the parietal, and from the lateral plate of the parietal immediately below. It runs downwards, backwards and outwards, to be inserted on the middle third of the external edge of the pterygoid bone, and slightly into the posterior extremity of the transverse bone. As the muscle passes backwards it is closely connected with the external face of the spheno-pterygoid muscle; while the anterior temporal and parieto-mandibular muscle, together with the branches of the fifth nerve, cover it externally.

The muscle is very large in *Daboia* and arises more anteriorly than in *Acanthophis*.

Cuvier regarded the muscle as a dismemberment of one of the temporal group. From the relations of the nerve trunks to it, we consider that it has no connection whatever with the temporal muscles, and, as shown below, we believe it to be a specialised tensor palati. The nerve of supply emerges behind the fifth, from a foramen in the lower part of the alisphenoid, and occupies such a position as the nerve for the otic ganglion does in the higher animals.

The muscle acts as a protractor of the pterygoid bone, and therefore as an erector of the fangs.

M. PARIETO-PALATINUS (part of the tensor palati).

M. pterygo-sphenoidalis anterior, Hoffmann; Innerevordere Flügelmuskel, D'Alton; M. palatinus, Hübner; Prespheno-palatine, Owen; Spheno-palatine, Duvernoy, R. Jones.

The parieto-palatine muscle arises from the posterior concave surface on the lateral plate of the parietal bone, and runs forwards, downwards, and outwards, to be inserted on a small portion of the pterygoid, and on to the posterior two-thirds of the palatine bone. Some fibres may be traced to the mucous membrane surrounding the fangs, here performing the office of retractors of the membrane. The muscle lies at its origin between the parieto-pterygoid and the pterygo-sphenoid muscles, and as it runs forward it comes into relation with the fascia covering the lachrymal gland.

It is this muscle which acts slightly on the gland in venomous serpents, while it is the masseter in the non-venomous. This muscle is supplied by the same nerve as the parieto-pterygoid, and we regard it as part of that muscle. In *Diemenia* there is essentially but one muscle. We have changed the title of sphenoto parieto-palatine, since the muscle arises wholly from the lateral plate of the parietal in all the venomous forms that we have examined; while in *Morelia* it arises lower down, but even here but few fibres are attached to the basisphenoid. In *Python*, according to D'Alton, the muscle arises in great part from the basisphenoid. The muscle in *Daboia* arises more anteriorly than in *Acanthophis*, so that it comes to lie more in the orbital fossa.

The muscle retracts the palatine and pterygoid bones, and also, as mentioned above, acts on the mucous membrane of the fangs in the *Elapidæ*; this action being performed by the pterygoid in the vipers.

M. VOMERO-SPHENOIDEUS.

M. vomero-sphenoideus, Hoffmann; Zuruckzieher des Vomer, D'Alton; M. sphéno-vomèrien, Dugès and Duvernoy; Prespheno-vomerine, Owen, and R. Jones.

The vomero-sphenoideus is a small muscle displayed on removing the fascia from the roof of the mouth. It arises as a small belly of muscle from a depression on the lateral plate of the parietal, close to the basisphenoid. The muscle runs forward beneath the trabeculæ cranii, and ends in a very fine tendon which is inserted on the posterior end of the vomer.

The muscle appears to be a differentiated portion of the pterygosphenoideus. Its action is to depress and retract the premaxilla through acting on the vomer.

Some authors have stated that they consider the muscles connected with the pterygoid and palatine bones of the snake to have no analogues in other animals. The muscles certainly present an extremely different aspect and function to the palate muscles; yet when we consider the extreme modification that the bones have undergone, we cease to wonder at the change in the

soft parts. We consider that the parieto-pterygoid represents the tensor palati; while the spheno-pterygoid represents the levator palati, the parieto-palatine being a differentiated portion of the tensor. The change in these muscles has been brought about by the position taken by the pterygoid bone, it having encroached on the region where normally the tensor and levator palati have an insertion into fibrous membrane only. Regarding the nerve supply, which is somewhat difficult to make out, the parieto-pterygoid is supplied by a nerve that issues from an aperture in the alisphenoid, and occupies such a position relative to the fifth as a nerve coming from the otic ganglion would.

The spheno-pterygoid appears to be supplied from the seventh.

SUB-OCCIPITAL ARTICULAR.

Sub-occipital articular, Dugès, Duvernoy, Owen, and R. Jones; not mentioned by D'Alton or Hoffmann.

The muscle springs from the posterior portion of the basisphenoid and the anterior part of the basioccipital. It passes outwards and backwards to be inserted on the middle third of the posterior border of the quadrate. As the muscle runs outwards it lies as a thin sheet on the posterior portion of the sphenopterygoid muscle; while the dorsal muscles lie internal to it.

The two sub-occipital articular muscles are described as constituting an azygos muscle. There are, however, two distinct muscles, each arising as stated above. Again, the muscle is not so closely related to the quadrato-mandibular joint as the name would seem to imply.

A similar muscle is described by Sanders (25) in *Platydactylus japonicus*, and in *Liolepis belli*, whilst we have found it to be present in *Hydrosaurus*. Sanders considered it to represent the laxator tympani, while Owen compares it to the depressor tympani of fishes. We, however, think that, if the muscle is tympanic in nature, it will represent the tensor tympani.

The Dorsal Muscles.

The dorsal muscles may be divided into two groups, the mesiodorsal and the latero-dorsal. The first consists of the spinalis and longissimus sets, the second of the sacro-lumbalis and accessorius.

Mesio-dorsal group (Humphry), Neuro-mesial (Owen).

The superficial fascia that covers the dorsal muscles is scanty. It is connected above with the neural spines, and from thence runs outwards over the spinalis, longissimus, and sacro-lumbalis, where it blends with the superficial layer of the external oblique.

The fascia is the representative of the external oblique stratum continued over the dorsal muscle. This is well shown in the anterior fourth of the body of *Daboia*, where the muscular fibres of the oblique layer completely replace the fascia. In the other forms examined it was only on approaching the head that the muscular fibres became conspicuous.

M. SPINALIS DORSI.

M. capito-vertebralis, Hoffmann; Der aufsteigende Muskel zwischer den Dorn- und Gelenkfortsätzen, D'Alton; M. spinalis, Hübner, Owen, Jones; Dorn- und Halbdornmuskel, Meckel.

The spinalis dorsi arises from the upper portion of the lateral surface of the neural spine, and from an aponeurosis which stretches between the neural spines and the zygapophysis, covering in the multifidus. Each part of the muscle runs forward as a rounded belly, ending in a long slender tendon which is inserted into the apex of the neural spine of the ninth vertebra from the origin. The tendons of the muscles are arranged so that the anterior ones lie external to, and beneath, the posterior; at the same time the tendons are connected with one another by fascia so that an aponeurosis is formed. The fascia is also modified to form a number of thecal sheaths, thus enabling the tendons to move with great facility. Tendons from the longissimus join this aponeurosis.

The muscle presents no points of difference in any of the forms examined, and the above description might apply even to the

spinalis of *Hydrosaurus*. The muscle is supplied by the internal branches of the posterior primary divisions of the spinal nerves.

M. SEMISPINALIS DORSI.

The tendons of the semispinalis arise from the flattened surface on the upper side of the postzygapophysis. Running upwards, forwards and inwards, the tendons end in well marked bundles of muscle, which fuse with the under and lateral portions of the spinalis, and so are indirectly inserted into the neural spines. The tendons of origin are closely connected with the aponeurosis covering in the multifidus beneath.

In Morelia in addition to the muscular bundles that are developed at the extremities of the tendons, there are a number of leaves of muscle which spring from the anterior border of the tendons, and also from the vertical aponeurosis of the longissimus. These bundles give rise to what appears to be a distinct series of muscles running between the semispinalis and the longissimus. This series is called by D'Alton, Zweiter oder kurzer absteigender Muskel zwischen den Gelenken und Dornfortsätzen; by Hübner, M. spinoso-vertebralis; by Meckel, Vieltheiliger Rückgratsmuskel; by Hoffmann, postzygapophyses-spinales. In Hydrosaurus there is an intermediate arrangement between what we see in Acanthophis and Morelia, the second series becoming united with the first. We therefore consider that the bundles in Morelia are but specialised portions of the semispinalis proper. The internal divisions of the nerves run up and pierce the multifidus, and then lie between it and the semispinalis, supplying the latter and the spinalis, at the same time giving branches to the accessory bundles in Morelia.

M. MULTIFIDUS SPINÆ.

Mm. neuro-spinales, Hoffmann; Muskel zwischen der Wirbelbogen und den Dornfortsätzen, D'Alton.

The multifidus arises from the lower part of the lateral surface of the neural spines, immediately beneath the origins of the spinalis. It also arises from the general fascia that stretches between the neural spines and zygapophyses, separating it from the spinalis and semispinalis above. The muscle runs forwards and outwards, the superficial fibres of each bundle pass over the vertebræ to be inserted into the lamina of the fourth, the deeper fibres being attached to the laminæ of the vertebræ passed over. The tendons of origin of the spinalis run upwards and inwards over the muscles, and are closely connected with the aponeurosis stretching between the neural spines and the zygapophyses. Each moiety of the multifidus is triangular in outline, the apex being at the spine, the base at the lamina. As the tendons of the spinalis run inwards they cross the side of the triangle nearest to them; we thus have a number of acute angular spaces formed whose floor is composed of the aponeurosis mentioned above. It is from these spaces that the spinalis dorsi arises in part.

If we consider this muscle as multifidus, we are met by the difficulty that the fibres run from the mid-line outwards. But the direction of the fibres being the result of function, and therefore necessarily inconstant in direction, we do not consider that this is a sufficient reason for not regarding the muscle as multifidus.

The relation of the nerve, running between the muscles and the semispinalis, adds to the idea of its homology with the multifidus.

In *Hydrosaurus* the muscle takes the same direction, but each bundle of fibres is in this case arranged around a strong tendon in a pinnate manner, the tendon running from the neural spine outwards to the laminæ and zygapophyses.

As we have shown, the multifidus is attached to the laminæ over which it passes, and some of the lowermost fibres consequently pass from one lamina to another only. We, therefore, get a series of small muscles which represent the rotatores dorsi. Those are described by D'Alton as "die obere Reihe zwischen den Gelenkfortsätzen;" and by Hoffmann as part of the intertransversarii. The nerve fibres pierce these muscles.

MM. INTERSPINALES.

Mm. interspinales, Hoffmann, Owen; Zwischendornmuskeln, Hübner, Meckel, D'Alton.

The interspinales arise from the anterior border of the neural spine, and run forwards and slightly outwards to be inserted on each side of the posterior borders of the spine immediately in front, and slightly into the laminæ leading up to the spine.

Hoffmann has described this muscle; but in the figures attached to his paper he has described as interspinales the postzygapophyses spinales.

M. LONGISSIMUS DORSI.

M. semispinalis, Hoffmann; Der lange, absteigende Muskel zwischen den Gelenk- und Dornfortsätzen, D'Alton; Halbdornmuskel, Meckel; Longissimus dorsi, Owen, Jones.

The longissimus dorsi arises by tendons from the processes of the anterior zygapophyses. The tendons of origin are blended together, so that a vertical aponeurosis is formed which stretches between the zygapophyses, separating the longissimus from the spinalis group, and at the same time helping to give origin to the semispinalis. As the tendons run upwards and forwards they pass into muscular bundles, which are arranged in a laminated position, the posterior overlapping the anterior.

Thus a column of muscle is formed which gives off two sets of tendons, an inner and an outer. The inner set runs towards the neural spines, and joins the tendons of the spinalis, helping by this means to form the median aponeurosis described above. The outer set serves to give origin to the sacro-lumbalis muscle, and as in the case of tendons of origin an aponeurosis was formed, so now these outer tendons are joined together, and a partition is by this means formed between the longissimus and the sacro-lumbalis. This aponeurosis reaches down to the ribs where it is attached, and so the muscle gets an insertion by this means.

The muscle by its inner tendons acts as a semispinalis; while its outer tendons can act as retractors of the ribs.

We are at a loss to understand on what ground Hoffmann and Meckel could consider this muscle as a semispinalis.

The muscle is supplied by the external division of the spinal nerves.

M. INTER-TRANSVERSARII.

M. inter-transversarii, Hoffmann (lower part); Die untere Reihe der Gelenkfortsätzen, D'Alton.

Belonging to the longissimus series is a small muscle which runs between the processes of the anterior zygapophysis. Some of the fibres as they pass backwards spread out over the fascia covering the levatores costarum.

These muscles correspond to the lower pair of intertransverse muscles described by D'Alton and Hoffmann; their superior intertransverse muscles we consider to be really part of the rotatores dorsi group. They are separated from the latter muscles by the aponeurosis of the longissimus tendons at their origin, and by the internal divisions of the nerve trunks, while they are separated from the levatores costarum beneath by the external divisions of the posterior portion of the spinal nerves.

Latero-dorsal group. (Humphry).

M. SACRO-LUMBALIS.

M. retractor costæ biceps, der zweibauchige Ruckwartszieher der Rippen, D'Alton; Stratum secundum et tertium, Hübner; M. opistothenar, Meckel; sacro-lumbalis, Owen, R. Jones.

The sacro-lumbalis is a muscle composed of two columns, an internal and an external.

The muscular bundles of the internal column arise from the aponeurosis formed by the external tendons of the longissimus muscle; they also have an origin from the tendons of insertion of the accessorius. Each bundle is somewhat flattened and runs upwards and forwards to form a column of muscles, whose external surface splits into a number of leaves which constitute the external column. The elements of this external column are inserted by means of tendons, which run downwards and forwards to the ribs at the point where the levatores costarum arise, the tendons of the two being closely connected.

In dissecting a dog at the time of writing this paper, we were struck by the similarity of the constitution of the sacro-lumbalis and accessorius in that animal with these muscles in the snake, the position of the nerves being also similar.

The external portions of the posterior primary division of the spinal nerves run up internal to the external aponeurosis of the longissimus, and giving off a branch to supply this muscle and the inter-transversarii, pierce the aponeurosis and supply the sacrolumbalis and accessorius.

M. ACCESSORIUS AD SACRO-LUMBALEM.

Mm. praezygapophyses - costales, Hoffmann; Gelenkfortsatrippenmuskeln oder lange Rippenheber, D'Alton; Stratum quartum, Hübner.

The accessorius is made up of a number of small muscles, each of which springs from the junction of the inner with the outer third of the ribs, and runs forwards and inwards to be inserted into the head of the third rib from the origin. These muscles are hidden from view by the sacro-lumbalis which lies above. They are not attached to the zygapophyses, as stated by Hoffmann and D'Alton.

Cranio-vertebral muscles.

M. SPINALIS CAPITIS.

M. capito-vertebralis, Hoffmann; Der aufsteigende Muskel zwischen den Dorn- und Gelenkfortsätzen, D'Alton; M. spinalis, Hübner; Dorn- und Halbdornmuskel, Meckel.

The spinalis dorsi is continued forward towards the head, where it is inserted on the supra- and exoccipital bones close to the middle line. The only change that is noticeable is that the muscle becomes more fleshy, the tendons of insertion into the spinous process being much smaller. Its insertion in the skull is tendinous. The continuation of the spinalis in *Diemenia* is not so well marked as in the other forms. If we follow the muscle forward we find at about the tenth dorsal vertebra, that the bundles begin to end in

rounded bellies, which are continued on by long tendons to the neural spines; the most anterior being inserted on the spine of the axis, while a few muscular fibres reaching from the axis to the skull, show that there is a continuation on of the muscle. With this arrangement in *Diemenia* we have a greater development of the complexus than in other forms. The continuation of the muscle on to the skull is no doubt accounted for by the function that it performs, it being able to draw the head well back. This is of especial value in venomous snakes, for it is by this means that the fangs are disengaged from the prey.

The continuation of the spinalis is met with to some degree in man in the spinalis cervicis muscle; and we may, perhaps, regard the fasciculi going to the complexus as part of this continuation.

RECTUS CAPITIS POSTICUS MAJOR ET MINOR, ET OBLIQUUS CAPITIS INFERIOR.

If we follow the multifidus forward we find that the bundles springing from the anterior three vertebræ are conspicuous for their size. The most anterior bundle springs by a tendon from the spine of the axis and partly from the atlas, and running as a well-defined rounded muscle is inserted on the exoccipital. This we consider to represent the rectus minor. The next bundle springing from the third vertebra is well defined, running to be inserted on the exoccipital close to the minor. This we take to be the representative of the rectus major.

The obliquus is not defined as a separate muscle, but it is plain that as the muscle bundles of the multifidus run forward and outward, that a muscle will run from the anterior spines to the lateral portion of the atlas, and so represent the obliquus inferior.

M. COMPLEXUS.

At about the tenth vertebra from the head, there are developed between the spinalis and longissimus a number of muscular bundles, which take the place of the meagrely developed semispinalis. The bundles arise from all the anterior vertebræ except the atlas, and coalesce to form a well-defined muscle which is inserted on the exoccipital close to the insertion of the spinalis. In *Diemenia* the muscle is very conspicuous, and is developed in proportion to the slight insertion of the spinalis on the skull.

We consider that this muscle represents the complexus, although it is on the same plane as the semispinalis.

M. TRACHELO-MASTOIDEUS.

This muscle is formed by the continuation of the bundles of the longissimus on to the skull. The muscle is a well-defined band inserted on the exoccipital immediately beneath the squamosal bone, being partly hidden from view by the complexus.

M. CERVICALIS ASCENDENS.

This muscle represents the continuation of the accessorius and sacro-lumbalis on to the skull. As these muscles run toward the head the bundles coalesce and form a single column of muscle, which is inserted on the lower tubercle of the exocciptal, being covered by the tendon of the superior rectus anticus at its insertion.

The muscle, like the spinalis, is produced on to the head to serve a special function, since by its action it helps the snake to "strike," and afterwards helps to disengage the fangs by pulling the head first to one side and then to the other.

The Internal oblique stratum.

The internal oblique stratum comprises the greatest part of the muscles that go to make up the bulk of the snake's body. If we reflect the anterior prolongation of the sacro-lumbalis column, we come on a sheet of muscle springing from the diapophyses of the anterior vertebræ, which are without ribs. The bundles composing the sheet run backwards and outwards till they meet the first rib, whereon some of the fibres are inserted, while others are prolonged over the external surface to be inserted on the second rib. This sheet represents the scalene group. If we follow the

stratum as it runs back towards the posterior extremity, we see that true external intercostals are formed between the ribs. these external intercostals those fibres which are nearest the vertebræ begin first to alter their direction, so that we have formed a series of levatores costarum externi, whose fibres are directed from within, backwards, and outwards; and since the layer reaches through the whole depth of the intercostal space, we have the internal fibres similarly affected, and thus are produced the levatores costarum interni. But not only do the fibres next the vertebræ change, but also those which lie between the intercostal cartilages change from the true external intercostal direction to a more antero-posterior one. This is brought about by the cartilages of the ribs bending forward. Thus are produced the "retrahentes costarum breves" (Hoffmann). We find the arrangement described above on the first intercostal spaces; but as we go more posteriorly we find, arising from the ribs at the place where the levatores costarum interni are inserted, bundles of fibres which run outwards and backwards over two or three ribs. These are the first pretrahentes costarum superiores; and they are evidently formed by the continuation of the fibres of the external intercostals over more than one intercostal space. It is to be noted as supporting this, that they spring from where the levatores are inserted, and that where there are levatores there are no other muscles of this group overlying them. As we follow these muscles back, we find that the fibres cross more intercostal spaces until they reach their maximum by being inserted into the ninth rib from the origin, at the same time however they give slips to all the ribs crossed over. Not only have we formed a group of pretrahentes costarum superiores, but we have also an inferior group formed in the same manner, the only difference between the two being that the fibres of the inferior group, since they arise at the junction of the inner twothirds with the outer third, must necessarily run more anteroposteriorly than the superior group.

Beside these intercostal muscles we have obliquus internus proper, and also a rectus, with its modification in the scutal muscles and the hyoid group.

PRETRAHENTES COSTARUM SUPERIORES.

Mm. pretrahentes costarum, Owen; Intercostales superiores, Hoffmann; Obere, lange Zwischenrippenmuskeln, D'Alton; Stratum quintum, Hübner; Vorderer, gezahnter Muskel, Meckel; Great lateral costal muscles, R. Jones.

The pretrahentes superiores arise from the junction of the inner with the middle third of the superior border of the rib, close to the point of insertion of the levatores costarum group. Each muscle runs outwards, backwards, and downwards, to be inserted into the ninth rib from the origin at the junction of the middle with the outer third. Each muscle as it passes back gives slips of insertion to all the ribs that it passes over. The muscle arises by long thin tendons which are closely connected with the tendons of insertion of the sacro-lumbalis.

Each bundle of an anterior portion of the muscle is external to a posterior bundle. The muscles, taken as a mass, form well-marked prominences on the sides of the snake, and help in a greater measure to determine the bulk of the snake. Home and R. Jones describe each bundle of these muscles as running over four ribs only; this, however, is not correct. As stated above, we believe these muscles to be modified external intercostals. The large lateral branch of the intercostal nerve that leaves the anterior of the body, is chiefly distributed to this muscle, and the next to be described.

PRETRAHENTES COSTARUM INFERIORES.

Mm. intercostales inferiores, Hoffmann; Untere lange Zwischenrippenmuskeln, D'Alton; Stratum sextum, Hübner; Aeusserer schiefer Bauchmuskel, Meckel; Extension of the pretrahentes superiores, Owen; Great inferior costals, R. Jones.

The pretrahentes inferiores arise from the ribs at the point where the superiores are inserted, and running back nearly parallel with the long axis of the body, they are inserted on the ninth rib from the origin. As they run back they likewise give slips to the ribs over which they pass. The muscles are sometimes described as being continuous with the upper set; they are distinguished from the upper set by the bundles running more antero-posteriorly. They, however, appear like the superior muscles to be modified intercostals.

MM. LEVATORES COSTARUM EXTERNI.

Mm. levatores costarum, Hoffmann; Rippenheber, D'Alton, Hübner, Meckel; Transverso-costal, R. Jones; Levatores breviores, Owen.

The levatores costarum arise from the process extending upwards from the diapophysis, also from the rib articulating with the diapophysis. Each muscle runs backwards, and slightly downwards, to be inserted on the upper portion of the inner third of the anterior surface of the rib immediately behind. The muscle can act not only as an elevator to the ribs, but also as an external oblique muscle. The levatores costarum are wholly hidden by the sacro-lumbalis and accessorius; these, however, being separated from them by the origins of the external oblique from the lateral septum.

Each muscle is supplied by a branch from the intercostal nerves; it emerges close to the line of insertions.

MM, LEVATORES COSTARUM INTERNI.

Mm. costo-vertebrales inferiores, Hoffmann; Innere, kleine vorwärtszieher der Rippen, D'Alton; Innere Rippenheber, Meckel; Spinoso-costales, Hübner.

The levatores costarum interni arise from the base of the hypapophyses and from the inferior surface of the centrum. They run outwards, and backwards, to be inserted into the under surface of the head of the rib, immediately behind.

This is the arrangement in all the venomous snakes that we have examined; but in *Morelia* and other non-venomous forms the levatores costarum are large muscles arising from the hypapophyses and inserted into the third vertebra behind. The intercostal nerve runs internal to these muscles, separating them from the transverse layer.

In Morelia the levatores form the prominent muscular column on the inferior surface of the vertebral column when the depressores have been reflected, while the subvertebral rectus is but slightly developed. In Acanthophis and in all venomous forms that we have examined, the subvertebral rectus forms the prominent column, the levatores being insignificant. This peculiarity has not been before pointed out.

MM. INTERCOSTALES EXTERNI.

Mm. intercostales proprii, Hoffmann; Zwischenrippenmuskeln, D'Alton and Meckel; Intercostal, R. Jones, Owen.

The external intercostals spring from the posterior and inferior surface of one rib, and are inserted on the anterior surface of the rib immediately behind. The muscle extends from the head of the rib to the extremity, where the costal cartilages arise. The muscular fibres run from before backwards and outwards, taking the usual direction of external intercostal fibres. Between the intercostal cartilages the fibres run more antero-posteriorly, and so this portion of the muscle is usually described as though it were a distinct muscle.

On comparing this portion of the muscle to the corresponding portion in *Hydrosaurus*, we find that the same alterating in the direction of the fibres has occurred but to a less degree, and the muscle is so obviously but a continuation of the external intercostals, that we do not see the necessity for a distinct name.

Hoffmann has named these antero-posterior fibres Mm. retrahentes costarum breves; D'Alton, Muskeln zwischen Rippenknorpeln; Hübner, Intercostales recto-decursu binas costas intercedentes; Meckel, Gerader Bauchmuskel; Owen, Rectus abdominis.

The intercostals are covered superiorly by the levatores costarum, and the pretrahentes superiores and inferiores. Inferiorly they are separated from the depressores costarum by the intercostal nerves. The main portion of the latter pierces the muscle, so as to gain the superior surface, at a point where the depressores are inserted into the ribs, and on arriving at the surface supplies the pretrahentes group.

61

M. OBLIQUUS INTERNUS.

M. cutaneus internus, Hoffmann; Der innere oder untere Bauchhautmuskel, D'Alton; Innerer, schiefer Bauchmuskel, Hensinger.

The internal oblique is composed of a number of "leaves" of muscle, which arise from the external surface of the costal cartilages; and in addition a tendinous expansion spreads over the pretrahentes costarum inferiores, constituting a lateral portion of the muscle. The whole runs forward and inwards towards the mid-line, the "leaves" of muscle widen by encroaching on the lateral tendinous portion, and then fuse with the upper layer of the rectus, which is differentiated to form the scutal muscles; at the same time these "leaves" give rise to a tendinous expansion internally, which fuses with the fascia of the transversalis in the mid-line.

We do not find that an obliquus internus is described in the snake by other writers; the muscle "leaves" mentioned above correspond, we believe, with portion of the rectus as described by Humphry in *Pseudopus*. We however think, after comparing this muscle with the internal oblique of *Hydrosaurus*, that we have given its true homology.

If we follow the internal oblique forward we find it converted into the costo-mandibularis, or, as pointed out in the description of that muscle, into a muscle which represents the sterno-hyoid group.

M. RECTUS.

Hautmuskeln, Hoffmann, D'Alton.

The rectus is represented by a large mass of muscle, which is chiefly concerned in forming the scutal bundles. It consists of two layers. The inferior is composed of a broad sheet of muscle whose fibres run antero-posteriorly. This layer is inserted on to the upper surface of the ventral scutes, and is continuous laterally with the external oblique muscle. The superior layer is differentiated into special bundles, which constitute the scutal muscles proper. The several bundles occupy different planes, and have

different degrees of obliquity as regards the mid-line. Thus there is a median bundle occupying the mid-line whose fibres run anteroposteriorly. This is the M. interscutalis proprius of Hoffmann. On the other side of this are bundles whose fibres run from without inwards and forwards. These are the Mm. scutales mediales. Between these sets of muscles, and occupying a higher level, we have bundles running from within outwards and forwards. These are the Mm. pyramidales. Running from the mid-line outwards across the latter muscles, and consequently occupying a higher place, we find bundles called Mm. interscutales majores. It is with these latter bundles that the fibres of the internal oblique muscle fuse.

If we follow the rectus forward we have the deeper layer still attached to the ventral scutes, while the superior layer is converted into the hyoid group of muscles, with the exception of the mylohyoid; and we thus get portion of that stratum named by Humphry the "deep brachio-cephalic."

M. OBLIQUUS EXTERNUS.

M. cutaneus externus, Hoffmann; Der grosse, äussere oder Seitenhautmuskel, D'Alton; Aeusserer, schiefer Bauchmuskel, Heusinger.

The external oblique muscle consists of two layers. The superficial of these is continuous with the fascia covering the dorsal muscles. As we shall see later on this fascia is gradually replaced by the superficial layer as we go towards the anterior extremity of the snake. The deep layer is made up of a number of bundles which spring from the fascia representing the lateral septum, lying between the sacro-lumbalis and the levatores costarum muscles. The bundles run outwards and backwards over the pretrahentes costarum superiores, and coalescing with the superficial layer, the whole muscle is inserted on the lateral scutes, its fibres gradually fusing with the lateral portion of the rectus.

If we follow the external oblique layer forward, we find that the superficial layer which we saw represented but slightly in the posterior part of the body, now becomes conspicuous, since the

muscular bundles replace the fascia that overlay the dorsal muscles. This layer is attached to the aponeurosis formed by the tendons of the spinalis dorsi, and it is also prolonged over the head muscles and beneath the mandible. The most anterior of the fasciculi of the deep layer are attached to the quadrate. We thus have formed what is called by Humphry a "superficial brachio-cephalic stratum," which is divided again into a cervicalis superficialis superior and inferior.

The cervicalis superficialis superior has in turn a superficial portion, constituted by a platysma, and a retractor oris, depressor mandibulæ, and retractor quadrati.

The cervicalis superficialis inferior is represented by an intermandibularis anteriorly, and a mylohyoid posteriorly. The deep layer of the external oblique that we saw attached to the quadrate, represents the sterno-mastoid; while the whole of the cervicalis superficialis superior represents the sphincter colli of birds.

PLATYSMA.

M. atlanto-epistropheo-hyoideus, Hoffmann; Rückwärtszieher des Zungenbeins, D'Alton.

The platysma is represented by a slight layer of muscular fibres extending upwards over the retractor oris, and running forward to be lost on the masseter.

The platysma is not mentioned as occurring in Ophidians; but the following facts tend to show that we are justified in considering that a platysma is really present.

In *Python bivittatus*, D'Alton found a band of muscular fibres extending from the neural spines round to the hyoid bone. We have found the same in *Morelia* and in *Hydrosaurus*; in the latter this band being but a superficial part of the well-developed platysma.

We see, therefore, the disappearance of a sheet of muscle as a whole from a class of animals in which it could obviously be of no use, but at the same time a specialised band of muscle remains, since it performs a function quite foreign to that of the platysma.

In Acanthophis and the other venomous snakes examined, the band was not so well developed as in Morelia.

RETRACTOR ORIS.

Retractor oris, Humphry; Cervico-angular, Duvernoy; M. cervico-mandibularis (sphincter colli), Hoffmann; Trachelomastoideus, Owen; Nackenunterkiefermuskel, D'Alton; M. temporalis, von Teutleben; M. cervico-mandibularis, Cuvier.

The retractor oris arises from the aponeurosis of the spinalis attached to the anterior three or four neural spines. Running forward, outwards, and downwards, over the digastric and posterior portion of the articular, the muscle ends in a tendinous expansion inserted into the symphysis of the lips and the integument adjoining.

In *Daboia* and *Morelia* this muscle divides into two layers as it runs forward, the deeper one being inserted into the articular, the superficial having the same arrangement as in *Acanthophis*.

The muscle may represent a zygomaticus major. It certainly corresponds to the retractor portion of the cervicalis superficialis of *Lepidosiren* and the dogfish, as pointed out by Humphry. On the other hand, it corresponds to part of the sphincter colli of birds.

The muscle acts as a tensor of the symphysis of the lips, thus enabling the inferior portion of the masseter to work with a "pully-like" action round the symphysis. Some of its fibres also pass on to the capsule of the venom gland, thus serving to steady the gland when the masseter is contracting on it.

M. RETRACTOR OSSI QUADRATI.

M. retractor ossi quadrati, Hoffmann; Rückwärtszieher des quadratum, D'Alton; Filum musculare s.-tendinosum (?), Hübner.

This small band of muscle springs by a very delicate tendon from the posterior portion of the upper extremity of the quadrate. Running backwards and downwards the tendon gives way to a muscle which passes beneath the retractor oris but lies on the depressor mandibulæ. When the muscle reaches the costomandibularis, its fibres spread out and are lost over this latter muscle.

The muscle represents a portion of the sphincter colli of birds.

DEPRESSOR MANDIBULÆ.

M. depressor mandibulæ, Humphry; Neuromandibularis, Duvernoy, Owen, R. Jones; M. cervico-hyoideus (in part), Hoffmann; and Nackenzungenbeinmuskel, D'Alton.

The depressor mandibulæ arises from the aponeurosis attached to the neural spines of the sixth to the twelfth vertebræ. The muscle runs forward as a broad sheet over the pretrahentes costarum superiores, and the deep bundles of the external oblique, then bending beneath the end of the mandible it is joined by the costo-mandibularis, and thereupon becomes mylohyoid.

In *Daboia* and *Pseudechis* the muscle is intersected by two tendinous bands running from the hyoid bone outwards towards the end of the mandible. In these cases the muscle is quite separated from the mylohyoid.

Humphry describes in *Pseudopus* one band occupying the position of the posterior one here, and he remarks that Reudinger supposes it to represent an acromion. From what we have said above we regard these bands as part of the cornua of the hyoid.

The muscle is separated from the retractor oris, by a slight interval, as it approaches the quadrate. This is explained on referring to *Hydrosaurus* where we see the external auditory apparatus occupying the interval.

This muscle also corresponds to part of the sphincter colli of birds.

M. MYLO-HYOIDEUS.

M. mylohyoideus, Hoffmann; Kieferzungenbeinmuskel, D'Alton; Latissimus ingluviei, s. platysma myoides, Hübner; Hautthalsmuskel, Meckel; Costo-mandibularis, Owen.

The mylohyoid, as mentioned above, is formed by the coalescing of the fibres of the depressores mandibulæ and costo-mandibulæ. The muscle may be said to arise from the ossified part of the hyoid, and from the tendinous intersections when they are present. Running forward the muscle meets its fellow of the opposite side in the median line, while laterally it is inserted on the inferior surface of the mandible, between the temporal muscle above and the pterygoid below, reaching as far forward as the dentary. The muscle forms a floor which hides from view the superior muscles together with the nerves and vessels.

From its origin at the hyoid bone the muscle is able to protract the lingual sheath and so act on the tongue, thus resembling a genio-hyoid function.

M. INTERMANDIBULARIS.

M. intermandibularis, Owen, Duvernoy; Die sich kreuzen den Muskeln des Unterkiefers, D'Alton; Cervico-hyoideus (in part), Hoffmann.

This muscle springs from the lower border of the anterior two-thirds of the dentary. The fibres run inwards and backwards to the mid-line, where they meet the fibres of the opposite side. At their junction a well marked median raphe is formed. These muscles are evidently but portions of the mylohyoid, whose fibres have changed their direction with their corresponding change in function, i.e., to bring the divaricated mandibles together. In Hydrosaurus, where the muscles could be of no use in this respect, the fibres of this region are specially modified to serve as compressors of the sublingual glands. In Acanthophis a small band is detached from the upper surface which winds round each sublingual gland and performs this function. This band was first pointed out by Leydig.

From the posterior portion of the muscle a well marked band of fibres runs back. It lies above the mylohyoid, and is inserted into the inferior surface of the mandible. In *Daboia* it is connected with the anterior fibrous intersection. It may represent a ceratomandibular as seen among lizards.

M. COSTO-MANDIBULARIS.

M. costo-mandibularis, Duvernoy, Jones and Owen; included in the Cervico-hyoideus of Hoffmann and D'Alton.

The costo-mandibularis is formed by plates of muscle which spring from the costal cartilages of the third to the tenth rib. These bundles correspond to those described as forming posteriorly the internal oblique proper. Instead of being inserted into the superior layer of the rectus, the bundles are collected into a sheet which runs forward above the fibres of the depressor mandibulæ, and coalesces with them, helping to form the mylohyoid, at the same time becoming inserted into the hyoid bone.

In *Daboia*, however, where the tendinous intersections occur, these bundles are inserted into the posterior tendinous band, and thus represent a sternohyoid muscle.

Hoffmann has followed D'Alton in describing this muscle as part of the depressor mandibule, but from its formation and relations, it clearly belongs to the middle and not to the external stratum

From its insertion into the hyoid the muscle can act as a retractor of the lingual sheath and tongue, thus resembling the action of the sternohyoid.

By its continuation into the mylohyoid, and so indirectly on to the mandible, it can act as a depressor of the lower jaw.

M. HYO-GLOSSUS.

M. hyoglossus, Hoffmann, Owen; Zungenbeinmuskel, D'Alton. The hyoglossi come into view when the mylohyoid is reflected. The muscles arise as two rounded bellies from the inner side of the ossified hyoid rods. Running forward the muscles coalesce, and are continued as one muscle into the lingual sheath, where they join the intrinsic muscles of the tongue.

These muscles are generally taken to represent the hyoglossi, but it is doubtful if this is their true homology. Owen is certainly

wrong when he describes the whole tongue as composed of hyoglossi. In *Pseudechis* the muscles arise from the anterior third of the hyoid bones, while at the posterior third there is an interhyoid muscle; the hyoid bones in this species being remarkable for their length. The muscles are similar in *Hydrosaurus* to those described above.

M. GENIO-HYO-GLOSSUS.

M. maxillo-hyoideus, Hoffmann; Genio-hyoideus, Meckel; Vorwärtszieher des Zungenbeins, D'Alton; Genio-hyo-glossus, Owen; Genio-vagiens, Duvernoy.

This muscle arises by two heads—the external from the junction of the anterior with the middle third of the dentary, the internal from the median raphe of the intermandibularis. The two heads running backwards and inwards coalesce, and are inserted on the lingual sheath, and on the anterior portion of the hypobranchial rods.

These muscles are the main protruders of the tongue. The corresponding muscles in *Hydrosaurus* resemble these very closely.

M. GENIO-TRACHEALIS.

M. genio-trachealis, Owen, Duvernoy; Maxillo-laryngeus, Hoffmann; Vorwärtszieher des Kehlkopfes, D'Alton.

The genio-trachealis is a small band of muscles arising from the same spot as the outer head of the genio-glossus. It runs backwards and inwards to be inserted on the side of the trachea; at the same time some fibres spread out on the lingual sheath and the floor of the mouth.

This muscle appears to represent a dismemberment of the genio-glossus. The muscle is present in *Hydrosaurus*. The action of the muscle is to protrude the trachea while the animal is passing a large prey through its gape.

M. HYO-TRACHEALIS.

M. hyoideo-laryngeus, Hoffmann; Rückwärtszieher des Kehlkopfes, D'Alton; Retrahens laryngis, Hübner.

The muscle arises from the anterior portion of the hyoid rod, and runs forward to be inserted into the floor of the mouth close to the insertion of the genio-trachealis, while many of its fibres are attached to the trachea.

This muscle is probably a dismemberment, like the geniotrachealis, of the genio-glossus.

The Transversalis Stratum.

The transversalis stratum of the ventral muscle is well developed in snakes. If we lay open the abdomen, and turn aside the intestines, we see a well marked column of muscle lying on either side of the hemal spines, whose fibres run forward and outwards; the columns are composed of the depressores costarum. On removing these muscles, we come on a levator layer, running from before backwards; these represent a subvertebral rectus. On either side of the depressores, we have the transversalis muscle and fascia lying in a sheet beneath the ribs, and hiding from view the retrahentes costarum running from before, backwards, and outwards. We do not find any internal intercostals, their place being taken by the depressores and retrahentes, which we regard as greatly altered internal intercostals.

If we trace the depressores forward we find them being converted into longus colli and rectus capitis anticus.

M. TRANSVERSALIS.

M. abdominis externus et internus, Hoffmann; Der äussere Bauchmuskel, und der innerere Bauchmuskel, D'Alton; M. transversalis, Owen.

The transversalis muscle proper is represented by two sheets of muscle, which spring from the junction of the outer with the inner half of the inferior surface of the ribs, just external to the insertion of the depressores costarum. Two layers composing the transversalis run downwards and inwards, the muscular fibres gradually giving place to a strong tendon which meets its fellow of the opposite side along the middle ventral line.

In the non-venomous snakes, with the disappearance of the hypapophyses, the transversalis is continued inwards as a sheet of fascia, containing a slight amount of muscular tissue, and is inserted on the anterior common ligament, coalescing with the fascia that gives origin to the depressores costarum in this region. We see therefore that the transversalis very distinctly arises from the vertebral column in non-venomous snakes, and that in venomous snakes the very slight layer of fascia found beneath the depressors is the representative of this sheet, which corresponds to the anterior lamella of the tendon of origin of the transversalis in higher animals.

With regard to the two sheets of muscle bundles making up the main body of the muscle, the external one has its fibres arranged in bundles, the direction of the fibres being from without inwards and forwards, corresponding to the direction of the retrahentes costarum, and therefore having such a direction as a subcostal group of muscles would take. The layer corresponds with D'Alton's äussere Bauchmuskel. The inner layer has its bundles of fibres placed in a direction corresponding to a true transversalis muscle.

M. DEPRESSORES COSTARUM.

M. costo-vertebrales superiores, Hoffmann; Innerer, grosser Rückwärtszieher der Rippen, D'Alton; Costales interni superiores, Hübner; Transverso-costal, R. Jones; Retrahentes costarum, Owen.

The depressores costarum arise from the extremities and sides of the hypapophysis. The muscular bellies coalesce at their origin, and then run forwards and outwards, each to be inserted by a tendon on the middle of the posterior border of the fourth rib from the origin, at the same time giving slips to the ribs over which they pass. This is the arrangement in venomous snakes, but in *Morelia* a considerable change takes place with the disappearance of the hypapophysis. Instead of the muscular bundles arising directly from the vertebræ, they now arise by means of a strong aponeurosis attached to a well marked anterior common

ligament, stretching between the tubercles representing the hypapophyses. Along with this mode of origin we have also a change in the appearance of the muscles, which now have the appearance of a number of quadrilateral plates, and these do not form such a prominent column as when the muscles arise from the well developed hypapophyses. The muscles are separated from the internal levatores costarum by the intercostal nerves; while below or internal to it is the vertebral fascia of the transversalis muscle. These muscles are present in all the lizards that we have examined, Hydrosaurus, Calotes, Hinulia, etc.

St. George Mivart describes them in Menopoma alleghaniense, adding the remark that "the muscle gets thinner and smaller backwards, but anteriorly it enlarges and passes in a fleshy mass beneath the skull." He also describes them in Iguana tuberculata, while Sanders mentions them in Platydactylus japonicus. Humphry describes them in Cryptobranchus and Pseudopus. The lower part of the longus colli in higher animals shows us the cervical representatives of these muscles. The arrangement of the origin of different parts of this muscle may offer some explanation as to the varying length of the hypapophyses.

Subvertebral Rectus.

The bundles of fibres which compose the subvertebral rectus spring from the sides and the bases of the hypapophyses, and running backwards and slightly outwards are inserted into the parapophyses of the third vertebra from the origin. The bundles are well marked in venomous snakes, but are but slightly developed in the non-venomous forms. The muscles are separated from the levatores costarum interni by the intercostal nerves; whilst they lie on the depressores costarum beneath.

We can find no reference to a subvertebral rectus as occurring in snakes, as it seems that this muscle has generally been taken along with the levatores costarum interni. That it belongs to a different group of muscles is evident from the relation of the intercostal nerves to it.

MM. RETRAHENTES COSTARUM.

Mm. retrahentes costarum longi, Hoffmann; Innerer, kleiner Rückwürtszieher der Rippen, D'Alton; Costales interni inferiores, Hübner; Retrahentes costarum inferiores, Owen.

The retrahentes costarum arise from the anterior border of the ribs at the junction of the inner three-fifths with the outer two-fifths. The flat quadrilateral bundles run forward and inwards, passing over three ribs to be inserted into the fourth at the place where the sternal cartilages join the ribs, at the same time giving slips to the ribs passed over. The muscles are separated from the external intercostals by large branches of the intercostal nerves; while they are also separated from the transversalis muscle proper by branches from the intercostal nerves.

These muscles most probably represent modified internal intercostals, combined with subcostals.

M, RECTUS CAPITUS ANTICUS.

M. rectus capitis anticus major et minor, Hoffmann; Der grosse, untere, und der kleine, gerade Kopfbeuger, D'Alton; Der gerade Seitenmuskel des Kopfes order Seitwürtsbeuger, Meckel; Rectus capitis inferior, Hübner; Longus colli, Owen; Transverso-spinalis inferior, Jones.

The rectus anticus is formed by the forward extension of the depressores costarum. These muscles as they approach the head divide into a superior and inferior layer. The inferior layer is formed thus:—the various bundles instead of running outwards and forwards to be inserted into the ribs, run inwards and forwards, and coalesce to form a single column of muscle which is inserted into the tubercle on the basioccipital bone close to the median line.

The superior layer still continues to have its bundles inserted on the ribs, until it reaches to the fourth vertebra, when the bundles coalesce and a second column of muscle is formed similar to the first, but running outwards and forward to be inserted into the lower tubercle of the exoccipital. The first of these columns is called by Hoffmann the "rectus anticus major," and the second one the "minor." The only objection to be offered to this is the fact of the different directions of the muscles, since they run from within outwards instead of from without inwards.

The form of these muscles is similar in all the snakes examined, and is much the same in Hydrosaurus. The reason for this great development is to be found in the fact that they are the main muscles by which the snake "strikes."

M. LONGUS COLLI.

The longus colli is not described in snakes, although we shall show that it is really represented.

The muscle which we have described above as the subvertebral rectus is continued forward to the skull. The first bundles spring from the basioccipital and run backwards to the hypapophysis of the atlas. This muscle might be described as a rectus medialis, but it is not met with in the higher forms, its place being occupied by the accessory ligament of the anterior occipito-atlantal. The succeeding bundles spring from the hypapophyses, and run outwards and backwards, thus resembling the longus colli; more posteriorly we have the subvertebral rectus, developed to a different degree in various forms, as we have shown above.

The Muscles of the tail, penis, and anus.

On reflecting the integument from the posterior portion of the body, we find that the columns of the spinalis and longissimus muscles are continued back to the extremity of the tail, while the sacro-lumbalis becomes much reduced, and is represented by a small band of muscle only. The bundles of the external oblique end immediately anterior to the anus, while the pretrahentes costarum superiores and inferiores run back to the last rib, where they coalesce with the bundles of the flexores caudæ. Posterior to the anus we have the flexor caudæ superficialis springing from the costo-transverse processes. The muscle meets its fellow of the

opposite side in the mid-line below, and together they are prolonged forward, giving off tendons of insertion to the costotransverse processes. Before reaching the anus they diverge, enclosing a space in which is seen the retractor cloacæ, and running forward they are inserted on the last rib, becoming continuous with the pretrahentes costarum. The layer of muscle appears to be on the same plane as the internal oblique stratum.

On reflecting this layer we come on the transversus penis and flexor caudæ profundus. The latter muscle is composed of a number of bundles springing from the costo-transverse processes; those run forward, and are inserted on the more anterior processes. The transversus penis is a well-marked sheet of muscle; the bundles arise from the hypapophyses, and run inwards and backwards, being attached to the penis, while they meet the bundle of the opposite side in the mid-line below. The nerves lie external to this layer.

On reflecting the transversus penis we find the retractor cloace and sphincter cloace, together with the penis and its retractor.

The retractores cloacæ are two columns of muscle lying on either side of the mid-line. The bundles arise from the hypapophyses, and running forward fuse with the fibres of the sphincter ani posteriorly.

External to these muscles lies a penis on either side with the retractor penis at its posterior extremity, springing from the hypapophyses.

A sphincter ani surrounds the anus, while on either side of this, external to the penis, is an elongated sphincter cloacæ. Lying above the retractor cloacæ and penis is a well marked layer of muscle, composed of bundles running from the hypapophyses backwards and outwards to the inferior costo-transverse processes. These muscles are in series with the subvertebral rectus described above.

The Spinal Nerves.

The spinal nerves emerge from the foramen formed by the notches at the bases of adjacent laminæ. They divide in the usual manner into anterior and posterior primary divisions.

The posterior primary division runs outwards for ashort distance, and divides into an external and internal branch.

The external branch runs backwards and upwards, winding round the pedicle of bone supporting the prezygapophysis, between, therefore, the superior facet of the transverse process, and the tubercle of bone above. Passing under the origin of the levatores costarum externi, it ascends and pierces the fibres of the rotatores dorsi, which lie between the zygapophyses; supplying these muscles, it then comes to lie between the semispinalis and the multifidus, to each of which it gives a branch, and ultimately is lost in the spinalis dorsi.

The external branch runs upwards and outwards, and, winding round the internal side of a levator coste externus, it comes to lie on this muscle, and beneath the longissimus to which it gives a branch. After this it pierces through the aponeurosis formed by the tendons of insertion of the longissimus, and breaking up into branches is lost in the sacro-lumbalis column.

The anterior primary division is a larger trunk than the posterior. It runs outwards between a levator costæ internus above, and the subvertebral rectus below (internal), thus separating the internal oblique stratum from the transverse. Soon it gives off two branches, one going to each levator costæ externus, the other to a levator internus.

The main branch runs outwards between the external intercostals and the depressores costarum. It gives off a well marked branch which supplies the depressores costarum, and a little more externally it supplies the transversalis muscle with a large twig which runs between the retrahentes costarum and the transversalis. When the main trunk reaches the point where the depressores are inserted it divides into two divisions. The larger of these two runs outwards between the external intercostals and the retrahentes costarum to each of which it gives branches, and then ends by supplying the pretrahentes costarum inferiores. The smaller of the two divisions, corresponding it would seem to the lateral cutaneous branches of other animals, pierces the external intercostals, and running outwards over the pretrahentes costarum superiores, and beneath the external oblique, it gives to each a branch and then continues on to reach the rectus and scutal muscles.

The Venom Gland.

When the integument is removed from the side of the head, portion of the lateral surface of the gland is displayed lying between the masseter above, and the superior labial glands below.

The superior surface is covered by the masseter; the inferior rests on the anterior part of the pterygoid muscle, the transverse bone, and the dense fascia which stretches between the pterygoid bone and the edge of the lip, and portion of the palatine aponeurosis. Internally the gland is related to the descending portion of the masseter, and is separated from the lachrymal gland and the parieto-palatine muscle by the suspensory ligament of the gland. Posteriorly it is separated from the anterior temporal muscle by another ligament.

The gland is obovate in shape, the anterior extremity being produced into the venom duct. It is surrounded by a dense fibrous capsule, which is also continued over the duct. This may be the representative of the true "parotid fascia." It is to this capsule that the masseter muscle is attached. A strong band of fascia springs from the external and posterior portion of the gland, and running back is inserted into the capsule of the quadratomandibular joint, and on the posterior and external ridge of the articular. This band has been named by Dugès the "zygomatic ligament," and he regards it as the representative of the zygomatic arch of birds. In the non-venomous species this band springs from the maxillary bone. It is also present in Hydrosaurus.

The capsule of the gland is continued into special bands of fascia, which form ligaments for its support. The best marked of these bands is the anterior, which springs from the fore part of the inner surface of the gland capsule, and is inserted on the postorbital bone, and on the orbital portion of the lateral plate of the parietal. Immediately behind this, the fascia which lies on the internal pterygoid muscle fuses with the fascia of the capsule along portion of its inner surface. Posteriorly and internally there is a well-marked band continued down from the capsule to the symphysis of the lips; here to be connected with the foremost fibres of the retractor or smuscle.

The capsule may be stripped off the gland with a little dissection, and we then come on an internal capsule, which is intimately connected with the proper substance of the gland.

The duct of the venom gland springs from its anterior extremity, and bending forward and outward runs in a groove on the lateral face of the maxillary bone until it reaches its anterior margin, around which it bends to end in a papilla, which is in relation to the small lacuna in the groove upon the anterior surface of the fang. There is no sigmoid curve in the duct, as there is in many vipers. The minute structure of the venom gland has been examined by Emery (No. 6), and presents nothing remarkable.

Mitchell (No. 18) has described an enlargement in the duct of the venom gland of *Crotalus*, which he considers to be a sphincter muscle. He says, "the elements [of the enlargement] are undoubtedly the characteristic cells of non-striated muscular tissue. Their presence together with the form and position of the enlargement restraining the wasteful flow of the secretion."

There is no enlargement in the duct of Acanthophis, or any of the other forms examined, but we are not prepared to say whether any muscular fibres are present. We should think that such an arrangement would be likely to occur in all venomous snakes.

The Lachrymal Gland.

The lachrymal gland is a small oval body lying on the posterior and on the internal surface of the orbit. It is hidden from view by the anterior suspensory ligament of the venom gland; while it is related by its inferior surface to the parieto-palatine muscle. The gland does not project backwards out of the orbital fossa as in the non-venomous forms; nor does the masseter muscle give any fibres to act as a compressor, as we find in the non-venomous forms.

The Labial Glands.

The superior labial gland is represented by a number of follicles placed along the superior labium. It meets its fellow of the opposite side anteriorly, while it is continuous at the symphysis of the lips with the inferior labial gland. This runs along the edge of the inferior labium, and anteriorly meets its fellow of the opposite side.

Sublingual Glands.

The anterior sublingual glands are two in number. They are placed above the genio-hyo-glossus, and the inter-mandibularis, and are immediately in front of the opening for the tongue on the anterior portion of the floor of the mouth, into which they open by numerous ducts. Posteriorly a muscular band embraces the gland. This is derived from the inter-mandibularis, and is called the "Vorwartszieher" of the gland by Leydig (No. 16). A band of muscle proceeding from the posterior extremity corresponds to his "Rückwärtszieher." In Hydrosaurus the whole of the inter-mandibularis is utilized in forming a compressor for the large sublingual glands. A well marked posterior sublingual is present immediately behind the anterior ones.

In comparing the relative state of development of the glands in *Acanthophis* with the development in *Morelia* and other forms, we have come to the same conclusions as Duvernoy (No. 5).

He was the first to point out that, in the Aglyphodontians we have the superior and inferior labial glands, as well as the lachrymal gland, very extensively developed. That in the Opisthoglyphians we have the glands relatively smaller, and a venom gland begins to be developed. In the Proteroglyphians we have

the lachrymal gland quite small, while the labial glands have also decreased, but that along with these changes we have a large venom gland. Lastly in the Solenoglyphians we have a small lachrymal, while the labial glands may even disappear, or be but slightly represented, but that we have a very much larger venom gland than is found in any of the other forms.

What conclusions do these facts tend towards? That since the non-venomous snakes are so plentifully supplied with glands about the mouth, whose function, it is generally conceded, is mainly that of lubricating the prey, how does it come about that the venomous snakes lubricate their prey, and yet have but slightly developed labial, lingual, and lachrymal glands? The answer will fall under one of these heads. Firstly, that the glands are sufficient for the purpose; secondly, that there are mucous glands diffused throughout the mouth; or thirdly, that the venom gland aids in the lubrication. In answer to the first proposition, we maintain that the glands are not sufficient for the purpose, for while moderately well developed in some venomous forms, they are abortive or almost so in others. To the second question, as to the presence of diffused mucous glands, we are not aware that they have been described. To the third question we now come with considerable diffidence. We are fully aware how much has been written against the view that the venom gland is a salivary gland in function, but we nevertheless incline to the belief that, not only does the venom serve to lubricate the prey, but that it even helps to digest it.

It is not our intention to go into this subject in this paper, but out of the many facts that we might urge in support of our view, we will take a single one as the result of our own experiments.

The experiment, we have since learnt, had been tried by Weir Mitchell some years ago. He says: "The final influence of venom upon the muscular structure was extremely curious. In every instance it softened it in proportion to the length of the time during which it remained in contact with it, so that after even a few hours in warm-blooded animals, and after a rather longer time in a frog, the wounded muscle became almost diffluent,

and assumed a dark colour and somewhat jelly-like appearance." Our experiments were mostly on fresh muscle, and in all cases the peculiar softening alluded to by Mitchell occurred, and the muscle could be easily broken up into a somewhat granular-like mass. We cannot say that the changes that take place are those of digestion, but the fact remains that the muscle is profoundly altered from a physical point of view; and if the change is not one of direct digestion, it nevertheless aids that process by the altered condition.

The most obvious objections to be urged against these views are, that a large quantity of the venom would be necessary, and that such a quantity would endanger the life of the snake.

We admit that the first objection is a strong one; with regard to the second, as to the effect of the venom on the snake itself, the results of the various investigators are so contradictory that the objection for the present must remain unanswered.

The Mechanism of the Bite.

In considering the various points connected with the bones and muscles in the mechanism of the bite of venomous snakes, we enter upon a field which has been gone over many times; and yet we think that there is room for new observations. Weir Mitchell has given an excellent account of the mechanism of the bite in his paper on *Crotalus*; but he nevertheless has missed several important points; and, in addition, he himself admits that he has not given an account of all the muscles concerned in the various movements; and lastly, the nomenclature which he has applied to the muscles and bones concerned, is in many instances quite different to that which we shall adopt.

We shall consider the bones which take part in the erection of the fangs.

The prefrontal is hinged to the frontal by a ginglymus joint. This joint is so constructed that the prefrontal may have an upand-down movement. Owing, however, to the anterior face of the frontal running from within, outwards, and backwards, the

prefrontal moves upwards and outwards, the lower portion coming also forward. This lower border rests on the superior surface of the maxilla which is, however, only slightly concave. Usually in venomous snakes there is a well marked ball and socket joint developed between these two bones, and accordingly considerable motion is possible; but in the case of *Acanthophis* the greatest movement takes place between the frontal and prefrontal. This probably misled Krefft when he described the fangs as being permanently erect. The transpalatine articulates with the posterior extremity of the maxilla by a concavo-convex surface, while it is immovably fixed to the pterygoid by its posterior extremity.

The palatine is fixed to the anterior extremity of the pterygoid by a ginglymus joint which allows considerable upward movement. The pterygoid is loosely attached to the articular and quadrate by ligaments, but there is not that close adhesion of the bones that is said to occur in *Crotalus*, for instance.

The mandible is attached to the quadrate by a ginglymus joint, closely resembling that of the human elbow. The quadrate stretches outwards, backwards, and slightly downwards, so as to carry the posterior extremity of the mandible from the middle line. The superior extremity of the quadrate articulates with the squamosal by a large flattened surface, which allows of moderate movement. The squamosal is firmly fixed to the side of the skull, and is capable of only slight, if any, movement.

The digastric acting on the posterior extremity of the mandible in such a manner that the jaw is turned into a lever of the first order. Owing to the length of the mandible from its anterior extremity to the articular surface, and the shortness of the posterior portion to which the muscle is attached, extended movement is gained with loss of power. When, however, the mouth is closed by bringing the mandible upwards, the lever is of the third order, great power being gained by the insertion of the muscles along the upper and middle portions of the bone.

Since the mandible is carried outwards posteriorly, while it is close to the middle line in front, it follows that, when the mandible

is depressed anteriorly, it will move downwards, outwards, and backwards, and by this means a wide gape is attained; this is aided by the fact that the mandible is concave above from before back.

With regard to the movements of the head on the atlas we have seen that, while downward movement is easy, upward movement is limited by the close apposition of the exoccipital to the atlas. This is a decided advantage, for the snake when striking is able to steady its head against the atlas by contracting the dorsal muscles prolonged on to the skull. And again, since the muscles which enable it to strike are attached to processes on the basioccipital, it follows that the head is acted on like a lever of the second order, the fulcrum being at the anterior face of the atlas; thus dislocation downwards of the occipital condyle is prevented by resting on the flat surface of the atlas, and by the exoccipitals meeting the anterior borders of this bone in the manner described above.

We now come to a point which is of considerable interest. Huxley and many others have described the erection of the fangs as the result of the action of the quadrate on the pterygoid bone, leaving out of the process the action of the special muscles which we have described above. Huxley says:-"When the animal opens its mouth for the purpose of striking its prey, the digastric muscle pulling up the angle of the mandible, at the same time thrusts the distal end of the quadrate forward. This necessitates the pushing forward of the pterygoid, the result of which is twofold; firstly, the bending of the pterygo-palatine joint; secondly, the partial rotation of the maxillary upon its lachrymal (pre-frontal) joint, the hinder edge of the maxillary being thrust downwards and forward. In virtue of this rotation of the maxillary through about a quarter of a circle, the dentigerous face of the maxilla looks downwards and even a little forward, instead of backwards, and the fangs are erected into a vertical position."

While we agree with the above description in regard to the actual movements of the bones, we unhesitatingly say, that the supposed means by which these movements are brought about are

not the true ones, but that the fangs are erected through the action of special muscles on the pterygoid bones. The observations of Weir Mitchell on this point entirely agree with our own, namely, that the mandible may be depressed and the mouth opened to any width without necessitating the erection of the fangs. He has further shown that by stimulating the special muscles attached to the pterygoid bones, erection of the fangs took place. Observations made on the dry skull are misleading, and tend toward the theory advocated by Huxley.

We will now follow the snake through those complex movements which take place when a prey is struck. A snake approaches its prey with movements which are almost imperceptible, since they are made of numerous small motions which are rendered possible by the great differentiation which has taken place in its body. When it deems that it is sufficiently close to its prey it begins the following movements:—the head and the anterior vertebræ are raised somewhat from the ground, and the head is brought back so that the exoccipitals are placed in apposition with the atlas, which in turn is jammed against the axis. This is brought about by the contraction of the dorsal muscles, which are produced on to the skull. At the same time some of the anterior vertebræ are so bent that they form a slight bow with the convexity forward.

While this has been taking place the digastric contracts, and pulling on the posterior extremity of the mandible, rotation takes place round the quadrato-mandibular joint, and the anterior portion of the mandible is depressed. The digastric is aided in this action by the depressor mandibulæ, and the costo-mandibulæ and mylohyoid attached to the inferior and anterior portion of the mandible. Along with the opening of the mouth the fangs are erected by the spheno-pterygoid and the parieto-pterygoid; the one acting above, the other below, draw forward the pterygoid, which leads to the rotation of the maxilla and prefrontal, since the transpalatine attached to the pterygoid shares with this latter bone its forward motion, and consequently being also attached to

the maxilla this bone moves slightly on the prefrontal, which in turn moves forward and upward, since it is articulated by a joint with the frontal.

Mitchell says that the spheno-pterygoid alone erects the fangs by acting on the pterygoid, but this is an error, as the parietopterygoid shares largely in this action.

The snake is now ready to strike. With head firmly fixed, mandibles depressed, and fangs erect, the blow is struck by the sudden contraction of the rectus capitis anticus group of muscles, which are attached to the processes on the basioccipital, and also by the contraction of the sacro-lumbalis group prolonged to the side of the basioccipital. The fangs enter in a downward and outward direction, and the jaw is closed by the contraction of the masseter, temporal, external pterygoid, and parieto-mandibularis muscles, along with which action the poison is injected through the contraction of the masseter on the gland. The squeezing of the gland is brought about thus:—the superior, or superficial, portion of the masseter contracting, pulls forward the posterior extremity of the gland; this action, however, is opposed by the strong zygomatic ligament attached to the gland externally and posteriorly. If now the inferior portion of the masseter contracts, the gland will be pulled downwards; this is opposed by the suspensory ligaments and by the integument below and externally made tense by the contraction of the retractor oris muscle; and also by the internal pterygoid, which is now contracting in order that it may pull the fangs more deeply into the wound. Thus opposed on all sides the gland is squeezed by the masseter most effectually. Now that the fangs are deeply sunk in the wound, and the solid teeth of the palatine are also driven in, the snake, if it no longer wishes to hold its prey, proceeds to extricate its teeth. This is not always an easy matter, and frequently the head is rotated from side to side in order to loosen the too firm hold. This rotating action is evidently largely aided by the insertion of the longissimus and sacro-lumbalis groups in the skull. If, however, the snake can disengage itself without any difficulty, it does

so by relaxing the internal pterygoid, and contracting the parietopalatine muscle and the spinalis group; the latter pulling the head upwards and backwards, while the parieto-palatine tends to do the same for the palatine bone, which coming into contact with the maxilla helps to raise that bone, and so aids in extricating the fangs. When the fangs are once more free, the internal pterygoid contracts, and pulling back the transverse and pterygoid bones depresses the fangs; the parieto-palatine aiding in this by drawing back the palatine. The fold of mucous membrane which surrounds the fangs slips up to the base of the fangs when these are erected. When depressed the mucous folds again regain their former position. This is described in Crotalus as being brought about by a slip of muscle from the pterygoid being attached to the folds. In Acanthophis, however, the parieto-palatine sends forward a slip which aids in this action. The chief element, however, appears to be some elastic fibres which are contained in the membrane, and when the fangs are erected these are put on the stretch; but when the fangs are depressed the fibres assume their former state, and so the membrane is brought back over the fangs.

In the non-venomous snakes the muscles attached to pterygoid bones and palatine act so as to draw the bones forward or backwards, as the case may be. By this means the prey is drawn gradually into the mouth.

Movements of the Vertebræ.

In regard to the movements of the spinal column, we have to deal with no less than ten articular surfaces for each vertebra. Two each on the zygosphene and zygantrum, two pre- and postzygapophyseal, and the ball and socket of the centrum.

Taking two vertebrae that are articulated to one another, we see the postzygapophysis of the anterior resting on the prezygapophysis of the posterior, the zygosphene of the second with its facets in the zygantrum of the first, and lastly, the ball of the anterior resting in the socket of the posterior.

If now the anterior one be moved so that its front portion turns to the left, while its hinder extremity goes to the right, we shall observe the following order of events:-the postzygapophysis of the right side moves outwards and forwards; this brings the articular facet, with the projection on its posterior edge, (vide supra) forward, so that the facet rests mainly on the projection on the anterior edge of the prezygapophysis beneath. There is no obstacle to the movement of this zygapophysis in an outward direction beyond that offered by the ligaments. Meanwhile the postzygapophysis on the left side has moved inwards and backwards. This brings the facet, with its projection on the posterior edge, backwards and inward, and the projection now coming into contact with the sides of the lamina prevents any further movement in that direction. If we had had another vertebra in front of our anterior one, we of course would have found that it was the right anterior zygapophysis that was stopped in its motion by coming into contact with the pedicle of the front vertebra.

Thus if we represent the points of movement as taking place at the angles of a square, we shall see that at the two extremities of one diameter we have an obstacle to further motion, while at the extremities of the other diameter we have comparative freedom.

To these considerations we must now add the movements of the zygosphene and zygantrum. With regard to these, the same side that received a check above, will receive one now. And if we add to this the opposition afforded by the ball and socket joints of the centrum, we shall see that whenever one vertebra of a series moves from side to side, its movement becomes limited by bone in four places, and by ligaments in ten, or in other words we have dislocation opposed at fourteen points.

Vertical movement.

The middle one of three vertebræ is prevented from moving in a vertical direction to any great extent by the following surfaces. Anteriorly we have the zygosphene in its firm zygantrum, and also the prezygapophyses lying beneath the postzygapophyses of

the preceding vertebra. Lastly, we have the ball and socket joint of the centrum. Thus we have five bony surfaces opposing vertical movements anteriorly. On the other hand we have only three opposing its movement downwards. To compensate for this, we have the mechanical advantage of the ball and socket joint alluded to in describing the centrum. Posteriorly we have five surfaces opposing movement downwards, and three upwards. The reason for this appears to rest in the fact that the spinalis dorsi, semispinalis, and multifidus all run from behind forward, and consequently when these muscles act they tend to pull the vertebræ upwards and backwards, or in other words to cause them to rotate round an axis placed at right angles to the long axis of the body; consequently the anterior portion of each vertebra will be raised and the posterior will then endeavour to rotate, and thus we have the five bony surfaces of each end of the vertebra to resist the contractions of these muscles.

Classification.

As regards the classification of Acanthophis we have come to the conclusion that its correct position is among the Elapidæ. In external appearance it bears a strong resemblance to a viperine snake, and even the osseous elements of its skull tend to approach the Solenoglyphians. But when we examine the maxillary bone we are no longer in doubt as to its real position. This bone has undoubtedly the characters of the maxilla of the Proteroglyphians. There are a number of anterior grooved fangs succeeded by a number of small solid teeth. The size of the fangs is greater than that usually found in the Elapidæ, but this only corresponds to the great strength of the bones composing the cranium; while the venom gland also appears to be larger, both absolutely and in proportion, than is usual in the Elapidæ.

It would seem as if we had here a case of mimicry; one of the *Elapidæ* taking on the external form of a viper, and with this undergoing some slight internal modifications, but still remaining undoubtedly among the *Proteroglyphians*. Or we may have in *Acanthophis* a link between the venomous colubrine snakes and the vipers.

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EXPLANATION OF PLATES.

REFERENCES TO BONES.

 $A.-\text{Articulare}, \quad B.S.-\text{Basisphenoideum}, \quad B.O.-\text{Basioccipitale}, \quad D.-\text{Dentale}, \quad Ex.O.-\text{Exoccipitale}, \quad E.O.-\text{Epioticum}, \quad F.-\text{Frontale}, \quad Fg. \\ -\text{Fang}, \quad H.-\text{Hyoideum}, \quad L.P.-\text{Lateral plate of parietal}, \quad M.-\text{Maxillare}, \quad N.-\text{Nasale}, \quad O.O.-\text{Opisthoticum}, \quad P.-\text{Parietale}, \quad P.F.-\text{Postfrontale} \quad \text{(Postorbitale)}, \quad Pl.-\text{Palatinum}, \quad P.M.-\text{Præmaxillare}, \quad Pr.O.-\text{Prooticum}, \quad Pr.F.-\text{Præfrontale} \quad \text{(anteorbitale)}, \quad P.S.-\text{Parasphenoideum}, \quad Pt.-\text{Pterygoideum}, \quad Q.-\text{Quadratum}, \quad S.-\text{Squamosum}, \quad S.M.-\text{Septomaxillare}, \quad S.O.-\text{Supraoccipitale}, \quad S.T.-\text{Sella turcica}, \quad T.C.-\text{Trabeculæ} \quad \text{cranii}, \quad Tr.-\text{Transversale} \quad \text{(transpalatinum)}.$

References to Muscles.

A.T.—Temporalis anterior. C.C.M.—Costo-mandibularis. C.M.—Ceratomandibularis. D.—Digastricus. D.C.—Depressores costarum. D.M.— Depressor mandibulæ. Ex. O.—Externus obliquus. Ex. I.—Externi intercostales. Ex.I.'- Externi intercostales (straight bundles). G.H.-Geniohyoideus. G.H.G.—Genio-hyo-glossus. G.T.—Genio-trachealis. I.M.— Intermandibularis. I.O.—Internus obliquus. I.O.T.—Tendon of internus obliquus. I.P.-Internus pterygoideus. L.C.I.-Levatores costarum interni. L.D.-Longissimus dorsi. L.D.'-Longissimus dorsi (deeper portion). L.G.—Lingual gland, (compressor band). M.—Masseter. M.H. -Mylohyoideus, M.S.-Multifidus spinæ. P.C.S.-Pretrahentes costarum superiores. P.C.I.—Pretrahentes costarum inferiores. P.M.— Parieto-maxillaris. P.Pt.—Parieto-pterygoideus. P.P.—Parieto-palatinus P.T.—Post-temporalis. P.Ex.—Pterygoideus externus. R.C.—Retractores costarum. R.C.A.-Rectus capitis anticus. R.M.-Rectus. R.O.-Retractor oris. R.Q.—Retractor quadrati. S.D.—Spinalis dorsi. S.S.D.— Semispinalis dorsi. S.L.—Sacro-lumbalis. S.P.—Spheno-pterygoideus S.O.A.—Suboccipito-articular. S.R.—Subvertebral rectus. S.V.—Spheno vomerine, S.—Scalenus, Tr.—Transversalis (inner bundles), Tr.'— Transversalis (outer bundles). T.T.—Transversalis (tendon).

- Fig. 1.—The parietal bone. The superior surface is represented with its three areas. The middle triangular one being subcutaneous, the lateral ones giving attachment to the masseter and temporal muscles, (X) is the anterior extremity, which articulates with the frontal bones. (A.L.) antero-lateral edge, articulates with postorbital bone. (M.L.) the median lateral. (P.L.) the postero-lateral. (Py.) is the well marked process which gives attachment to the parieto-maxillary muscle. (L.P.) lateral plate of the parietal. (P) the posterior extremity which articulates with the supraoccipital.
- Fig. 2.—The parietal bone. The inferior surface is represented together with the lateral plate. (L.P.) the lateral plate is seen to have an anterior depression, which is portion of the orbital fossa; while there is also a posterior depression, which gives attachment to the parieto-pterygoid and parieto-palatine muscles. (O.S.) is the position of the orbitosphenoid bone, helping to form the anterior portion of the orbital fossa. Between the lateral plates below, the basi- and parasphenoid bones fit; while the prootic joins its postero-lateral margin. (O.F.) is portion of the optic foramen.
- Fig. 3.—The frontal bone with the vertical septum of bone (V.S.)
- Fig. 4.—Postorbital bone, showing its twisted nature. To the inferior portion of this bone the fascia of the venom gland is attached as a special ligament.
- Fig. 5.—The basisphenoid (B.S.) and parasphenoid bones united. The inferior surfaces are displayed showing the excavated parasphenoid, with a trabecula cranii on either side (T.C.). Posteriorly the prominent keel of the basisphenoid is seen, while on either side of this the bone is excavated to give attachment to the sphenopterygoid muscle. (Px.) is the process which articulates with the inferior surface of the basioccipital.
- Fig. 6.—The superior surface of the para- and basisphenoid bones. (S.T.) the sella turcica.
- Fig. 7.—The basioccipital bone; the inferior surface. The anterior portion has an excavated area which articulates with the basisphenoid. Four prominent spinous processes are seen, which give attachment to the rectus capitis anticus, and the tendon of the sacro-lumbalis (S.L.)

- Fig. 8.—The bones of the upper jaw; external surfaces. (M.) The maxilla carrying three perforated fangs in front, and three solid teeth behind. (Tr.) the transpalatine with the well marked process (P.C.), which gives attachment to the internal pterygoid muscle. (Pl.) the palatine carrying solid teeth. (Pt.) the pterygoid with solid teeth.
- Fig. 9.—Superior surfaces of same bones. The concavo-convex joint between the maxilla and transpalatine is seen; also the excavated internal edge of the maxilla. The surface of the pterygoid is seen which gives attachment to the parieto-pterygoid and spheno-pterygoid muscles.
- Fig. 10.—Inferior surface of the same bones; the excavated surface of the pterygoid is seen which gives attachment to the internal pterygoid muscle.
- Fig. 11.—The prefrontal (Pr.F.) is seen, and on its superior edge is a well marked hinge-joint (H.J.), which articulates with the frontal.

 The articulating surfaces between the prefrontal and the maxilla are seen to differ from that present in most venomous snakes.
- Fig. 12.—The skull viewed from above. On the right side the postfrontal and the prefrontal have both been removed.
- Fig. 13.— Muscles of the head from above. On the left side the masseter has been drawn aside, and the attachment of its superficial fibres to the posterior portion of the venom gland (V.G.) is shown. (M.') is the deeper portion of the masseter, which chiefly goes to the lower jaw. The anterior temporal (A.T.) is displayed. (Z.L.) is the zygomatic ligament attached to the venom gland. (Pt.) are the fibres of the platysma spreading out to be lost anteriorly. The retractor quadrati is seen passing back beneath the retractor oris, but above the depressor mandibulæ. On the left side the spinalis dorsi has been removed, and the semispinalis is seen attached to the skull.
- Fig. 14.—The muscles of the head are seen from the side. The retractor oris (R.O.) is reflected, and the depressor mandibulæ is pulled aside. The attachment of the superficial portion of the masseter to the gland is seen, while the attachment of the masseter, posterior temporal, and internal pterygoid to the lower jaw is also seen. (S.L.G.) the superior labial gland. (I.L.G.) the inferior labial. (V.D.) the venom duct.

- Fig. 15.—The masseter has been removed from the venom gland, and the parieto-mandibular (P.M.) is displayed, as also is the anterior temporal (A.T.); the lachrymal gland (L.G.) is seen. (V.D.) venom duct.
- Fig. 16.—The venom gland has been removed. The slender parieto-maxillary is seen, and the attachment of the anterior temporal to the lower jaw. The posterior temporal has been reflected, and the external pterygoid displayed. The parieto-pterygoid (*P.Pt.*) is also seen, and the insertion of the internal pterygoid on the transverse bone.
- Fig. 17.—The temporal muscles have been removed, and the whole of the lower jaw. The parieto-mandibular is seen springing from the prominent process of the parietal. The parieto-pterygoid (P.Pt.) and spheno-pterygoid are seen attached to the pterygoid bone. 5", 5" branches of the fifth nerve emerging from the foramen ovale. (Q.B.) portion of the quadrate bone.
- Fig. 18.—The parieto-pterygoid and spheno-pterygoid muscles have been removed, and the parieto-palatine displayed. (S.O.A.) the suboccipito-articular (Dugès). (L.D.) longissimus dorsi attached to skull. (S.L.) sacro-lumbalis attached to basioccipital. (R.C.A.) rectus capitis anticus attached to basioccipital and exoccipital bones.
- Fig. 19.—Inferior surface of the head. On the right side of figure the mylohyoid has been removed, and the membrane lining the floor of the mouth is shown. (T.C.) trachea. Anteriorly portion of the intermandibularis is removed; the lingual gland (L.G.) with its band of muscle is seen. The attachments of the genio-hyoglossus and genio-trachealis are also seen. The genio-hyoglossus is shown to have a bifurcated attachment; one tendon being attached to the tendon of the intermandibularis in the midline; while the other is inserted into the inner side of the dentary. The attachment of the cerato-mandibularis has been cut; it runs forward and joins the tendon of the intermandibularis; posteriorly it lies along the lower jaw. The mylohyoid (M.H.) is seen to be attached to the bony hyoid (H.) internally, while anteriorly it is attached to the lower jaw. (T.I.-T.I'.) are the tendinous intersections which represent ceratohyal and hypohyal (T1.), and the first branchial bar (T'). The portion (H_{\cdot}) represents the hypobranchial portion of the hyoid. (G.H.) are the genio-hyoid muscles arising posteriorly from the hyoid bars. (J.H.) the junction of the hyoid bars (basihyal plate).

- Fig. 20.—The intermandibularis (I.M.) is shown giving off (IM'.) a slip to the integument (C.M.); the cerato-mandibularis joins the intermandibularis in front. (I.L.G.) inferior labial gland.
- Fig. 21.—The costo-mandibular (C.C.M.) is seen running forward to join the depressor mandibulæ (D.M.) to form the mylohyoid (M.H.). On the left side of the figure the mylohyoid has been removed, and we see the masseter (M.), posterior temporal (P.T.), and internal pterygoid (I.P.). The external intercostals are seen, and the scalene muscles, while the rectus capitis anticus (R.C.A.) lies still more deeply.
- Fig. 22.—The lower jaw has been removed. On the left side we have the internal pterygoid reflected, and the parieto-pterygoid and sphenopterygoid displayed. On the right side of the figure we have the internal pterygoid, and the aponeurosis of the roof of the mouth (P.A.). Anteriorly we see the small spheno-vomerine muscle (S.V.).
- Fig. 23.—The muscles composing the greater portion of the erector spinæ. The spinalis dorsi is seen to lie next the spinous processes (S.) and to break up into tendons which run forward to be inserted in the spines (S.). The tendons of these muscles are intimately connected and form a distinct aponeurosis. (L.D.) the longissimus dorsi group; the superior layer is seen to give off tendons which run outwards and form the tendons of origin of the sacro-lumbalis group. The inferior tendons run inwards and join with the tendons of the spinalis dorsi group.
- Fig. 24.—(S.L.) the sacro-lumbalis column, arising in part from the longissimus dorsi column, and inserted along with the tendons of the pretrahentes costarum superiores (P.C.S.). Between the tendons of the latter muscles are the tendons of the external oblique (Ex.O.).
- Fig. 25.—The muscles on the lateral aspect of the snake's body. The tendons of the sacro-lumbalis (S.L.) are seen to be inserted into the ribs along with the tendons of the pretrahentes costarum superiores (P.C.S.). The external oblique (Ex.O.) is seen to be composed of bundles intimately connected with the rectus (R.M.). The internal oblique springs from the costal cartilages as "leaves" of muscles, and running forward these are attached to the spaces between the scutal muscles (S.M.). A tendinous band (I.O.T.) continues the muscle towards the midline where it joins the tendon of the transversalis (T.T.). The fibres (Ex.I'.) are modified external intercostal muscles.

- Fig. 26.—The muscles in the interior of the snake's body. By the midline we have the subvertebral rectus (S.R.) and the depressores costarum (D.C.). On the left side of the figure levatores costarum interni (L.C.I.), separated from the subvertebral rectus by the intercostal nerves (I.N.).
- Fig. 27.—The depressores costarum (D.C.) are seen running forward to be modified so as to form a rectus capitis anticus major (R.C.A.), and at the same time representing the longus colli muscles. The most anterior bundle of the sacro-lumbalis column (S.L.) is seen to pass forward to be inserted on the basioccipital (B.O.), while the upper division of the rectus capitis anticus runs outwards and is inserted on the exoccipital. The scalene (S.) muscles are represented by the continuation of the external intercostal group on to the anterior vertebræ.

NOTES ON AUSTRALIAN EARTHWORMS. PART VI.

By J. J. FLETCHER, M.A., B.Sc.

In the following paper eight species chiefly from Eastern Australia are proposed as new, an attempt is made to deal with a number of small perichete worms from various localities, which are treated as varieties of species previously described, and further particulars are given about four species as the result of the examination of additional and better supplies of material than were originally available. As in previous papers the question of the genera to which some of the species described should be referred is left an open one; some of the most favourable localities even in this colony are yet unsearched for earthworms, and the question of instituting new genera is one therefore which may more profitably be considered later on.

The new forms include, firstly, five described as species of Cryptodrilus—one of the type of C. unicus, one with a remarkable arrangement of the outer couples of setæ the outer row of each of which is nearer to the mid-dorsal line than the inner row of each inner couple is to the mid-ventral line, one very robust form of the type of C. mediterreus and C. canaliculatus, and two others whose affinities at present are not very clear: secondly, a species of Acanthodrilus from N.W. Australia, the second species only of this genus so far recorded from Australia, in each case from the northern half of the continent: and thirdly two species of Perichæta, one of the type of P. austrina; the other a remarkable, probably intraclitellian form of the type of P. canaliculata, with a pair of conspicuous nephridiopores to a segment after the first, those of each side of the body forming a sinuous series.

I have to express my great obligations to Sir William Macleay, and to the Trustees of the South Australian Museum for the opportunity of describing several species, and to the following gentlemen for furnishing me, often at considerable trouble, with supplies of material, viz. Messrs. W. W. Smith, C. E. Rennie, Henry Tryon, T. G. Sloane, and the Revs. A. Swift, and T. F. Potts.

CRYPTODRILUS (?) FASCIATUS, n.sp.

Two (spirit) specimens 15-15.5 cm. long, 6-9 mm. broad; number of segments 90 and 130.

Colour: an anterior and a posterior portion of each segment of a light colour (dull yellowish in the specimens which have been some years in spirit and are in places somewhat stained or bleached), enclosing a wider middle dark purplish or purple band, reminding one of Allolobophora fætida; sometimes the purple band is broader than at others, especially at first, but on the whole the body in both specimens presents a very noticeable and characteristic banded appearance, alternately light and dark, obscured by the girdle on the clitellar segments.

Prostomium divides the buccal ring very slightly (less than $\frac{1}{3}$). Body apparently not so depressed (at any rate in spirit specimens) as in *C. unicus*; one specimen is faintly but distinctly canaliculate throughout in the median dorsal line, the other only shows it here and there. Segments more or less distinctly bi-annulate (in one specimen a layer of the body-wall is caking off which is 4-annulate on the surface, whereas underneath the surface is bi-annulate).

Setæ in eight straight rows, the setæ of the outer couples further apart than those of the inner couples, and about as far apart as (usually a trifle further than) the two couples of each side.

Clitellum in one specimen comprising six segments, XIII-XVIII, complete all round; in the other less developed, but segments XIV-XVIII together with the posterior half of XIII are noticeably modified

Male pore, oviduct pores (in front and just ventrad of the innermost setæ), spermathecal pores, dorsal pores, and nephridiopores as in *C. unicus*.

Alimentary canal: the esophagus longer, and the gizzard further back, than usual, the former extending through v, vi and into vii, the latter at first sight appearing to be contained in segments vii and viii, the mesentery between these two surrounding it at about its middle, but investing it posteriorly; from x or xi to at least xiv (behind which in the specimen dissected the canal was damaged) the interseptal portions are dilated possibly functioning as calciferous glands, and in xiii and xiv there are incompletely pinched-off pouches.

Genitalia: two pairs of testes and ciliated rosettes in x and xi; vesiculæ seminales five pairs in ix-xiii, the first two pairs small, the last pair still smaller and rudimentary, the third and fourth pairs very large; a single vas deferens on each side joining the prostatic ducts a little way from the prostates. Spermathecæ a median series of five single stalked, rather long pouches, sacculated in appearance, in segments v-ix, each of them with two linear, long (but shorter than the pouches) almost cylindrical cæca, one on each side.

Last pair of hearts in XII.

Nephridia: a pair of tubules to a segment after the first, consisting as well as I can make out of at least three portions, viz., a distal convoluted portion whose free extremity lies in the segment in front of that to which the nephridium belongs, a shorter narrower middle portion, and a proximal still shorter vesicular or dilated portion with a lateral diverticulum.

Hab.—Richmond River District, N.S.W. (Macleay Museum).

This distinct species differs from both *C. unicus*, and *C. purpureus* in having the body more robust and transversely striped, and from the latter in addition in the rows of setæ being straight. These three species form a group of closely allied forms whose claims to

be regarded as worthy of generic separation will be considered hereafter. I have a single specimen in very bad condition of what is probably another species of this group from the same district, given me by Mr. H. R. Whittell.

CRYPTODRILUS (?) PURPUREUS.

Cryptodrilus purpureus, Michaelsen, "Oligochæten des Hamburger naturhistorischen Museums," I.

Three spirit specimens from two different localities, 47 (juv.), 93, and 92 mm. long, 3-6.5 mm. broad; number of segments 116, 131, and 144.

Colour purplish above, paler below. Prostomium only partially divides the buccal ring (less than half). Segments for the most part bi-annulate, occasionally indistinctly tri-annulate. Setæ in eight at first straight longitudinal rows, those of the outer couples more than twice as far apart as those of the inner couples, and a little further than the two couples of each side; in about the posterior third of the body, or on about the last 40-50 segments the setæ of the two rows of the outer couple of each side are irregularly placed, sometimes alternating pretty regularly for a few segments, sometimes two or three times as far apart from each other, or from the inner couple, as at others.

Clitellum not developed, nor any indication of it in any of the specimens.

Male pore, oviduct pores, and spermathecal pores as in *C. unicus*. Dorsal pores commence after segment iv, but the first one appears to be rudimentary and not functional. Nephridiopores: the first three dorsad of, the others opposite, the fourth setæ on each side as long as these continue regular, afterwards continuing at the same level irrespective of the setæ.

Alimentary canal as in C. unicus.

Genitalia as in C. fasciatus and C. unicus.

Nephrida possibly as in C. fasciatus, but the details not made out.

Hab.—Miriam Vale, Queensland (two specimens presented by Dr. J. C. Cox to the Macleay Museum); Percy Island off the Queensland coast in lat. 21° S. (one specimen also in the Macleay Museum, collected by Mr. G. Masters during the 'Chevert' expedition in 1875).

The characters of the three specimens examined agree very well with Dr. Michaelsen's description based on the examination of specimens from Gayndah and Peak Downs, Queensland, but have the setæ slightly more irregular. Michaelsen says that the third and fourth rows are displaced on the last ten segments of the body, whereas in the specimens examined by me the irregularity affects more segments, about the last forty; also the first three pairs of nephridiopores are more dorsally situated than those which follow. The specimen from Percy Island is referred to in my second paper p. 971 under the head of "incertee sedis," owing to its immature and contracted condition its examination was not attended with very satisfactory results.

CRYPTODRILUS (?) UNICUS.

Cryptodrilus unicus, Fl., P.L.S. N.S.W., 1888, III., (2), p. 1540. Three additional specimens from a new locality; 63 (juv.) to 100 mm. long, 3-6 mm. broad; number of segments 126-144.

Clitellum in two of the specimens comprising segments XIV-XVII together with at least half of XIII and of XVIII. From the examination of these specimens, two of which are better developed than any seen before, and from a re-examination of the original specimens, my previous description may be amended as follows:—

The rows of setæ are straight and regular throughout.

The oviduct pores are in front and just ventrad (not dorsad) of the innermost setæ on xiv.

The gizzard is in segment vi.

There is a fifth pair of vesiculæ seminales on the posterior face of the mesentery between XII and XIII; the fifth pair, always the smallest, are so small in non-breeding worms as to be easily overlooked.

The spermathece are single median pouches, each with two ceca, as in *C. fasciatus*, and *C. purpureus*; not pairs of pouches one of each of which is rudimentary.

Hab.—The banks of Lake Cudgellico, a few miles from the Lachlan River, N.S.W. (collected by Mr. T. G. Sloane).

CRYPTODRILUS SMITHI, n.sp.

A good series of about eighty specimens killed in an extended condition from 21 (juv.) to 145 mm. long, 1-3 mm. broad; number of segments from about 135-170.

Prostomium divides the buccal ring all but completely. Body slender, cylindrical, segments mostly tri-annulate; colour pallid, the integument more or less pellucid.

Setæ in four ventral and four dorsal longitudinal rows forming on each side of the body a ventral and a dorsal couple separated by an ususually wide interval: the setæ of the ventral couples distant from each other about as far as (or a trifle less than) their inner rows are from the median ventral line; those of the dorsal couples at varying distances apart, the third row on each side not being straight, rarely closer but usually more distant than those of the ventral couples; except on the first three or four setigerous segments (II-IV or V) where they are a little further removed, the setæ of each fourth row quite close (unusually so) to the median dorsal line, closer than the first (ventral) row is to the median ventral line.

Clitellum of four segments, XIV-XVII, complete all round except for certain papillæ. On the ventral surface between each two segments from XV-XX, but encroaching more or less upon these, is a pair of contiguous nearly circular or elliptical eminences or papillæ, one on either side of the median line, their summits with a pore-like depression; those of the third and fourth pairs (between XVII and XVIII, and XVIII and XIX) much depressed, and less conspicuous, and with an additional very conspicuous papilla immediately dorsad of each of them—the posterior pair of which probably carry

the male pores which are not readily determinable; the papillæ of the fifth and of the sixth pairs not quite so close to the median line; the ventral surface about the bases of the papillæ usually more or less tumid, sometimes forming distinct transverse ridges on which the papillæ are situated. The youngest specimens show no trace of these structures; others show papillæ without any or with only slight modification of the surrounding surface; others again show pore-like depressions or these with the margins only slightly tumid forming rudimentary papille, situated on distinct transverse more or less intersegmental ridges* formed by the ventral surface of the posterior one or two annuli of each segment becoming tumid for a space extending dorsad on each side to as far as or beyond the second setæ, and more or less completely confluent with a similarly modified portion of the anterior one or two annuli of the succeeding segment, or only one of the two sets may be modified; the first and second ridges shortest (from side to side), the third and fourth longest (from side to side), most pronounced, and closer together; in this region what appear to be the intersegmental, are only interannular furrows. In adults with girdles the papillæ are well-developed, and the ridges usually less distinct, the remnants of them appearing as swellings about the bases of the papillæ, except in case of the first two pairs which are entirely surrounded by the girdle tissue. In examining a number of specimens differences in detail are common; rarely an additional pair, or only a single papilla, may be present between xiv and xv. Between VIII and IX, and IX and X a pair of similar papillæ with sometimes in addition a ventral portion of the preceding one or two annuli modified; the anterior pair probably carry the fourth pair of spermathecal pores. Occasionally the ventral surface behind the papillæ is also slightly modified; and in one case there is an additional papilla on one side between x and XI.

^{*}Possibly after all better regarded as primarily due to the coalescence and extension of the papillæ, as the ridges always show some indication of papillæ, whereas papillæ without ridges are not uncommon.

Male pores not readily determinable. Oviduct pores two, on XIV on little papillæ, in front and a little ventrad of the first setæ; spermathecal pores four pairs, intersegmental from v-IX, on little papillæ (the fourth pair of these modified as above) about opposite or slightly ventrad of the first setæ.

Dorsal pores commence after segment IV. Nephridiopores not visible (probably a pair on each segment except a few anterior ones).

Alimentary canal: gizzard in v (or vI); in some of segments IX-XVI there are dilatations some of which may be calciferous glands, but there are no pairs of pouches; large intestine commences about XVIII but is small and compressed between the prostates as far back as XXII.

Genitalia: two pairs of vesiculæ in IX and XII; two pairs of testes and ciliated rosettes in X and XI; a pair of prostates extending through about four segments, XVIII-XXI; genital ducts rather long and twisted; vasa deferentia not observed. Penial setæ absent. Ovaries and oviducts as usual; spermathecæ four pairs in VI-IX, stalked pouches with a single rudimentary clubshaped cæcum on the duct near its exit, the cæcum shorter than the duct.

Nephrida: a pair of convoluted tubules to a segment.

Last pair of hearts in XII.

Hab.—Eltham, Victoria (collected by Mr. W. W. Smith).

This distinct species is easily recognisable by the remarkably dorsal situation of the outer couple of setæ on each side, an exaggerated condition of the arrangement which is so frequently met with in species of this genus. Its affinities are not very clear.

CRYPTODRILUS TRYONI, n.sp.

One (very soft and not well preserved) specimen 325 mm. long, 10 mm. broad; number of segments about 209.

Buccal ring not divided by the prostomium. Colour (much bleached) more or less pallid, slightly tinged with brown superiorly. Body not canaliculate.

Setæ in eight straight rows, those of each outer couple remarkably far apart, not only further apart than those of each inner couple, but also (half as far again or even more) than the two couples of each side.

Clitellum of four segments, XIV-XVII, together with a small anterior portion of XVIII (but has not attained its maximum development), complete all round except posteriorly for a little space on the ventral surface of XVII.

Male pores not at all conspicuous (probably only owing to the condition of the specimen); the inner couples of setæ on XVIII are not visible, but about corresponding with the position of each inner setæ of these couples is a small pore, from one of which protrudes a portion of what is evidently a penial seta; possibly these are the male pores. Oviduct pores and spermathecal pores as in *C. mediterreus*.

Nephridiopores: a pair to a segment after the first, in two alternating series as in *C. mediterreus*; the first four pairs, and after these on alternate segments, opposite the fourth setæ; on segments vi, viii and x opposite the third setæ, and on xii and after that on alternate segments opposite the second setæ. Dorsal pores commence after segment v. Accessory copulatory structures not present.

Alimentary canal: gizzard in v; five pairs of latero-inferiorly situated calciferous pouches in IX-XIII.

Genitalia: two pairs of vesiculæ seminales in IX and XII, &c. as in *C. canaliculatus*; there is a single vas deferens on each side joining the genital duct close to the prostates; penial setæ are present. Spermathecæ three pairs, each of them with two cæca.

Last pair of hearts in XIII.

Eight mesenteries from the anterior one of VII to the posterior one of XIII are thick.

The nephrida of the lower rows (opening opposite the second setæ) as well as those of the upper rows have a proximal vesicular

portion, a condition which possibly obtains also in the other species of this group.

In other respects so far as I know at present not differing from C. mediterreus.

Hab.—Milton, near Brisbane, Queensland (received from Mr. Henry Tryon).

This species is allied to *C. mediterreus* and *C. canaliculatus*: with the former it agrees in having the body not canaliculate; and with the latter in having two cæca to each spermatheca; while it differs from both in having the body more robust (being the largest specimen of a *Cryptodrilus* I have yet seen, with the exception of *C. saccarius*, var., to be mentioned subsequently), the setæ of the outer couples further apart, and an additional pair of calciferous pouches in IX. In the soft condition of the specimen examined the sacs containing the penial setæ are not visible, as was the case with the specimens of *C. canaliculatus* previously examined, in which species also, as I have since found, penial setæ are present.

CRYPTODRILUS SEMICINCTUS, n.sp.

Four moderately contracted spirit specimens 40-54 mm. long, $2\cdot5-3$ mm. broad; number of segments about 100.

Prostomium partially divides the buccal ring (about half). Body probably pallid or slightly tinged with brown or yellowish brown, slender, segments mostly tri-annulate.

Setæ of the outer couples a little further apart than those of the inner couples which are not so close as usual, and nearly as far apart as the two couples of each side; the outermost row on each side not so dorsally situated as usual.

Clitellum of segments XIV-XVII together with half or two-thirds of XIII, saddle-shaped, reaching only to about the third row of setæ or a little ventral of it, not developed on the ventral surface.

Male pores two, on papillæ on the middle annulus of xvIII, about in line with the setæ of the second row; in front and also behind but a little dorsad of each papilla is a much smaller one,

usually intersegmental taking in one annulus of XVIII and one of the segment in front or behind, or confined only to the annuli of XVIII. Oviduct pores two, rather close together, in front and ventrad of the innermost setæ on XIV. Spermathecal pores two pairs between VII and VIII, and VIII and IX, in line with or just dorsad of the setæ of the second row.

Nephridiopores not visible in any of the specimens. Dorsal pores not determinable on the clitellum nor in front of it, the first visible one between XVIII and XIX.

Alimentary canal: gizzard in v; calciferous dilatations possibly in about segments ix-xiii, but no pairs of pouches; the large intestine begins in xvi.

Genitalia: one pair of testes and one pair of ciliated rosettes in XI; one pair of vesiculæ seminales in XII; a pair of long narrow linear folded prostates partly in XVIII and partly in XIX, anteriorly giving off the genital ducts which are fairly long and straight, a single vas deferens on each side joining the prostatic duct close to the gland; behind each genital duct is a pair of delicate sacs each containing a couple of curved tapering penial setæ. Ovaries and oviducts as usual; spermathecæ two pairs in VIII and IX, pouches with remarkably long ducts each with a pair of (in one case three) simple club-shaped cæca, one on either side of the duct near its exit.

Nephridia: delicate tubules, a pair to a segment.

Last pair of hearts in XII.

Hab.—Grafton, Clarence River, N.S.W. (received from the Rev. A. Swift).

A distinct species whose affinities are not very clear at present. I received a considerable number of worms from Mr. Swift, but with the exception of the above and half a dozen specimens of perichæte worms, the rest were simply the ubiquitous *Allolobophora turgida*, for which Grafton is the most northerly locality in N.S.W. from which I have yet seen specimens.

CRYPTODRILUS SIMULANS, n.sp.

Three rather contracted spirit specimens from 82-108 mm. long, 4-5 mm. broad; number of segments about 220.

Colour when fresh probably pallid with the integument more or less pellucid behind the girdle (spirit specimens usually tinged with brown). Prostomium only partially divides the buccal ring (less than half). Segments mostly tri-annulate after the first three or four.

Setæ of the inner couples closer together than usual, about half as far apart as those of the outer couples, the latter also about half as far apart as the two couples of each side; hence the outer couples or at least the outer rows of these are more laterally situated than in many species.

Clitellum: no sign of it in two specimens, just commencing in the third; when complete probably comprising XIV-XVII and part of XIII.

Male pores on two small papillæ, a little dorsad of the position of the first seta on each side, on the middle annulus of XVIII which presents a ridge-like swelling separated from somewhat similar but less pronounced ridges on XVII and on XIX by a depression in each case, the ends of the first and last ridges bending round and fusing with the middle one, their extremities reaching a little dorsad of the first couples of setæ; on the anterior annulus of XVIII and of XIX appears to be in each case a pair of pores. Oviduct pores two, in front and ventrad of the innermost setæ; spermathecal pores two pairs between VII and VIII, and VIII and IX, nearly opposite but a little dosad of the first setæ.

Nephridiopores not visible. Dorsal pores commence after about \mathbf{x} but the first one appears to be rudimentary.

Alimentary canal: gizzard in v, the mesentery behind it very thin; only two pairs of calciferous pouches seem to be present, in xivand xv, but these in the specimen dissected immediately attracted notice, and in one specimen are discernible from the exterior; large intestine commences in xvII.

Genitalia: two pairs of testes and of ciliated rosettes in x and xI; two pairs of racemose vesiculæ seminales in xI and XII; the prostates extend through about three segments; beside each straight genital duct is a pair of small sacs each containing several (3 or 4) curved and gradually tapering but not spinose penial setæ. Ovaries and oviducts as usual; spermathecæ two pairs in vIII and IX, their ducts remarkably long, each with a lobate somewhat compressed and rosette-like cæcum.

Last pair of hearts in XII. Nephridial tufts numerous.

Hab.—Bulli, Illawarra, N.S.W. (received from Rev. T. F. Potts and Mr. T. G. Sloane).

Externally and in the absence of the clitellum this distinct species might pass for a species of *Digaster* or *Megascolides*; like the preceding species its affinities are not very clear.

ACANTHODRILUS MACLEAYI, n.sp.

About 110 small specimens, one of the largest of which is 27 mm. long, 2 mm. broad; number of segment about 90.

Colour rather light yellowish-brown. Prostomium only partially divides the buccal ring (less than half).

Setæ: four pairs to a segment after the first one, the setæ of the outer pairs close together like those of the inner ones; the inner pairs on XVII and on XIX either not visible (probably then only obscured by the swellings on these segments) or situated a little dorsad of the usual position.

Clitellum present in a few specimens, comprising segments XII-XVI or XVII.

Male pores two pairs, a pair on XVII and a pair on XIX, the pores of each pair rather close to, and one on either side of, the median line, distinctly closer to the median line than the innermost row of each inner pair of setæ would be if normally placed. The ventral surface of XVII and XVIII, and to a less degree of the next two or three segments more or less modified and swollen as far

dorsad as the second pair of setæ, the modified surfaces more or less confluent, but intersegmentally for a short distance on either side of the median line less modified; hence the three or four intersegmental depressions (the first one between XVI and XVII) so commonly present in spirit specimens are probably post-mortem and due to shrinkage.

Oviduct pores, spermathecal pores, nephridiopores, and dorsal pores not determinable.

Alimentary canal: a single large gizzard present.

Genitalia: a large pair of vesiculæ seminales (probably in XII), a doubtful smaller pair situated two segments in front, with two pairs of ciliated rosettes (and probably testes) in the two intervening segments; prostates two pairs, with two pairs of straight fairly long genital ducts; four pairs of delicate sacs, a pair to each genital duct, containing penial setæ, long, curved, and tapering, and minutely notched distally, the free extremity not a sharp point, but flattened.

Nephridia: a pair of tubules to a segment.

Hab.—Napier Range, 100 miles S. of King's Sound, N.W. Australia (Macleay Museum, collected by Mr. W. Froggatt).

These were the only specimens of earthworms obtained by Mr. Froggatt during nearly a year's residence in the Kimberley District. Owing to their small size—the largest of them just exceeding an inch—it is difficult to make out the details or to localise the various organs. There is no doubt however about the presence of two pairs of prostates and two pairs of genital ducts. This species is distinct from A. australis from Cape York recently described by Dr. Michaelsen (l.c., p. 9).

PERICHÆTA MACQUARIENSIS, n.sp.

Five well preserved somewhat contracted spirit specimens 130-180mm. long, 5-7mm. broad; number of segments about 150-200.

Colour purplish or reddish-brown, paler beneath. Prostomium partially divides the buccal ring (about half); sometimes from its posterior margin a median longitudinal groove extends backwards as far as the third segment.

Setæ fewer, larger and more conspicuous, the setiferous ridges also more conspicuous, in front of the clitellum; segment II (the first setigerous one) with probably normally about 18 setæ [in the specimen in which the setæ are most complete there are 9 on one side and 8 on the other; most of the specimens have 16; one shows only 6]; segments III and IV with about 26; v-xv with about 28 (in one case segment VII has 15 on one side and 14 on the other), from XIX with 32-36, the posterior segments—except the last few—with about 40-44; very frequently owing to breakages or other causes only fewer than the numbers specified can be counted on a given segment. A median dorsal interval about 2-2½ times, and a median ventral interval about thrice the width of an ordinary interval between two setæ, devoid of setæ.

Clitellum (in two specimens) comprising four segments, XIV.-XVII.

Male pores on papille, about corresponding with the intervals between the first and second setæ; adjacent to and dorsad of each pore is an additional slight swelling or papilla. The posterior $\frac{2}{3}$ of the ventral surface of XVII and the anterior $\frac{2}{3}$ of xix modified, in each case with an indistinct pair of papille much as in P. austrina: in specimens with girdles the ventral surface of segments x and XI modified much as in P. austrina but the swellings are not pitted, and the posterior one is not subdivided; in one specimen on X.-XII are three pairs of swellings extending anteroposteriorly across the segment, and from side to side from about the first to the third setæ, with a little pit in front and one behind the setigerous ridge. Oviduct pores two, in front and ventrad of the innermost setæ; spermathecal pores three pairs, intersegmental after VI, nearly opposite or a little dorsad of the first setæ.

Dorsal pores commence after segment IV (sometimes apparently a rudimentary one after III). Nephridiopores not visible.

Alimentary canal: calciferous pouches in x-xIII (almost like a smaller pair in xIV).

Genitalia as in *P. austrina*, that is to say two pairs of testes and ciliated rosettes in x and xI, two pairs of vesiculæ seminales

in IX and XII &c.; but in the specimen dissected the ceca of the spermathece not so long (possibly only due to its non-breeding condition); and penial set only slightly curved but sharply bent almost at a right angle close to the free extremity are present. Last pair of hearts in XIII.

Hab.—Dubbo, N.S.W.; from the banks of the Macquarie River (collected by Mr. C. E. Rennie).

Allied to *P. austrina* and *P. hamiltoni*, but distinguished from them by the slightly more ventrally situated spermathecal pores, by details in the number of setæ, by the possession of penial setæ, and of a pair of hearts in XIII, and other details.

PERICHÆTA (?) TERRÆ-REGINÆ, n.sp.

One specimen rather contracted except in the middle region of the body which is soft and relaxed, 190 mm. long, 15-18 mm. broad; number of segments 144. Body stout, cylindrical; segments III-XIII biannulate, but with the anterior annulus in some of them faintly again subdivided; behind XIII there is little indication of annuli, nor are setiferous ridges anywhere prominent. Colour dark, probably purplish (the specimen both somewhat bleached and stained). Prostomium but slightly divides the buccal ring (about $\frac{1}{3}$).

Setæ: from their retraction, worn condition, or absence, it is difficult to determine the number of the setæ on the first few and the last few setigerous segments; elsewhere one may count from about 40-60 to a segment, with a median dorsal and ventral interval devoid of setæ of which the latter is fairly defined, its limiting rows of setæ straight, about five times the breadth of an ordinary interval between two setæ on the ventral and lateral surfaces where they are closer together, more regular, and not so frequently missing as on the dorsum; the latter much broader, ill-defined owing to the absence or irregularity of the setæ.

Clitellum not developed, but segments XIV-XXI, and XIII and XXII slightly, are of a noticeably different colour, a brighter

purplish; from experience in other cases I regard this as indicative of a waxing or a waning clitellum. If so then this species like *P. canaliculata* is intraclitellian.

Male pores on two large papillæ, the outer (dorsal) margin of each extending to about the sixth setæ, their inner margins connected by an intermediate somewhat swollen portion; these structures occupy the entire ventral surface of xviii within the limits mentioned, obscuring the setæ if these are present, and they bulge a little antero-posteriorly; the pores themselves are about in the line of the second row of setæ. Oviduct pores two, in front and a little ventrad of the innermost setæ on xiv; spermathecal pores four pairs in the intervals between segments iv-viii, about opposite or a little ventrad of the second setæ; (the first pair a segment in advance of the usual arrangement).

Dorsal pores commence after segment v. Nephridiopores a pair to a segment after the first, just behind the anterior margins, forming a single irregularly sinuous series on each side, the pores varying in position from opposite the fourth or fifth setæ to dorsad of any visible setæ, and not very far from the median dorsal line.

Hab.—Mt. Bellenden-Ker, N.E. Queensland (received from Mr. Henry Tryon).

This distinct species belongs to the same group as *P. canaliculata*, Fl., from the same district. At present I refrain from dissecting the single specimen available.

From time to time I have received or collected a number of small perichæte worms from various localities in N.S.W., which while differing for the most part a good deal in size or general appearance from the typical forms of the species to which as varieties, at any rate provisionally, I now propose to refer them, yet present no sufficiently satisfactory or important points of difference entitling any of them to rank as independent species. From the small size and stunted growth, or not good state of preservation of some of them, together with the difficulty in determining

the number of setæ on the first few setigerous segments they are not a very satisfactory lot to deal with; but for the sake of the interest attaching to the questions of variation and geographical distribution, the attempt is here made to deal with them.

The majority of them agree with Perichæta Macleayi described in my last paper in having (1) the preclitellar or a few more segments with 20 setæ per segment, increasing then to 24, and still further back to about 28-30; (2) the buccal ring nearly completely divided by the prostomium; (3) two pairs of spermathecal pores opposite the second or third setæ, or the interval between them; (4) both pre- and postclitellar accessary copulatory structures; (5) calciferous dilatations in some of segments IX or X-XIII, but pouches are not pinched off;* and (6) the same general chalacters of the genitalia, e.g., two pairs of vesiculæ seminales in IX and XII, and two pairs of spermathecæ each of them with a single long club-shaped cæcum. Besides size they differ among themselves slightly in regard (1) to the number and character of the accessory copulatory structures; the situation of (2) the first dorsal pore and (3) the spermathecal pores which in some are more nearly opposite the second, in others opposite the third setæ. They are accordingly treated as three varieties, noted separately from each locality. The remainder in which the number of setæ is slightly greater, probably normally 24 setæ on the anterior setigerous segments, are similarly treated as a variety of P. fecunda with two pairs of spermathecæ.

P. Macleayi, Fl., [l.c. (2) III, (1888), p. 1556], vars. nov.

Var a:—Thirteen specimens 60-87 mm. long, 3-4 mm. broad; number of segments from about 110-125.

Setæ: the first thirteen setigerous segments (ii-xiv or thereabouts) with twenty setæ to a segment [frequently only fewer are visible, often 16 or still fewer; nevertheless as 10 may often be counted on one side of a given segment, or a seg-

^{* &}quot;The two pairs of calciferous pouches in XI-XII" (l.c., p. 1557) are so incompletely pinched off as to be little more than dilatations.

ment with 20 may precede one with 16, or when fewer than 20 the setæ are evidently at greater intervals, it would seem that 20 per segment is the normal number; hence differences are probably quite as much to be attributed to wear and tear as to possible variation]; this number then gives place to 24 (occasionally two or three more, though in this region one may find a segment preceded and followed by one with a greater number) which continues for a number of segments; finally posteriorly except on just the last few segments the number increases to about 30 or a few more. The body tapers steadily posteriorly and here the dorsal interval devoid of setæ may be said to vanish, the interval being not greater than that between two ordinary setæ.

Clitellum comprising segments xIV-XVII, together with XIII partially.

Accessory copulatory structures comprise (1) the ventral surface of x outwards on each side to beyond the second seta tumid, more or less completely longitudinally divided in the median line, and with four fossettes, an anterior and a posterior pair; and (2) pairs of papille on XVI and XVII, the ventral surface of XVIII dorsad of the male pores also swollen.

Dorsal pores after v as in the typical form.

Hab.-Mt. Wilson and Lawson, Blue Mts., N.S.W.

Var. b:—Seventeen specimens 57 (juv.) to 120 mm. long, 3-4 mm. broad; number of segments about 115-140.

Setæ: on the preclitellar segments usually 20 per segment, but the following variations were noted in different specimens:—on segment \mathbf{v} , 14 on one side and only 8 on the other; on xiv, 14+14; on xv, 14+10: posteriorly the number may increase to about 40 setæ per segment.

Accessory copulatory structures: the ventral surface of xI swollen for a space extending outwards on each side to about the second seta, with a pair of fossettes, one on each side of the median line, in front and ventrad of the first setæ, rarely a little further apart; a similar but less completely developed area in

some specimens on x; in one specimen none on x but a swelling and one fossette on xII. On xVII and on xx (on the latter sometimes more like the structures on xIX but a little closer together) the ventral surface in the interval devoid of setæ tumid, with two fossettes, one on either side of median line, which may be confluent; on xIX a pair of papillæ each with a fossette in front of the interval between the first and second setæ. The above is the typical arrangement; but specimens vary both in regard to the number of these structures and the extent to which they are developed; and there may be an additional one on xXI.

Dorsal pores commence after segment IV.

Hab.—Burrawang, N.S.W.

Var. c. (i):—Nine specimens 35-74 mm. long, 2-4 mm. broad; number of segments 82-95.

Spemathecals opposite the interval between the second and third setæ, or even opposite the third setæ.

Accessory structures: the whole ventral surface of x and xI as far dorsad on each side as about the third seta, raised and swollen; opposite the interval between the first and second setæ a pair of fossettes. A pair of papillæ on xVII, and a pair on xIX, closer than 3 papillæ; a slight papilla on xVIII in median line in some specimens.

Hab.—Mt. Victoria, Blue Mts., N.S.W. (collected by Mr. A. G. Hamilton).

(ii):—Nine specimens not in good condition 36-50 mm. long, 2-3 mm. broad; number of segments 66-94.

Allowing for the poor condition of the specimens not distinguishable from the preceding; the accessory swellings on x and xI are as in that form, but though XVII, or XVII and XIX are modified, papille are not very evident.

Hab.—Raymond Terrace and Morpeth, N.S.W.

(iii):—Fifteen specimens 26-60 mm. long, 2-4 mm. broad: number of segments 75-115.

Not distinguishable from the foregoing. There are exactly similar swellings on x and xI, and at least indications of pairs of papillæ on xVII and XIX in some of the specimens.

Hab.—Coonabarabran, Gunnedah from the banks of the Namoi, N.S.W. (collected by Mr. T. G. Sloane).

P. FECUNDA, Fl., [l.c. (2), II. (1887), p. 401], var. nov.

Twenty specimens 38-62 mm. long, 2-3 mm. broad; number of segments about 90-115.

Colour dark purplish iridescent superiorly and anteriorly as in the typical forms, lighter posteriorly, and quite pale on the ventral surface.

Setæ: On the preclitellar segments 24 (frequently only 20 or fewer with evident gaps in the half-circles, especially on the first setigerous segment (II), but as examples can be found in which there are 12 on one or both sides of this segment the difference is evidently accidental); on some of the clitellar segments or just behind them the number usually increases to 28, but here and there only fewer can be counted; still further back the setæ are finer, closer together and more numerous, from about 30-40 when the half circles are complete.

Accessory copulatory structures: the ventral surface of segments x and xI outwards on each side to about the third or fourth seta swollen, with a pair of fossettes in front of and about opposite the second seta or the interval between the second and third setæ on each side (in immature specimens the general surface is less swollen, but the rudimentary circular shallow depressions or fossettes are in most cases recognisable). On xVI a circular raised area nearly filling the ventral interval devoid of setæ on this segment; a larger but elliptical area similarly placed on XVII (these two less evident when the girdle is developed); the ventral surface of XIX as far outwards on each side as the third seta raised, like a pair of papillæ or pores in front and opposite the interval between the first and second setæ; XX somewhat similarly modified but not dorsad of the first seta, or the surface simply raised with a pair of fossettes, one on either side of median line.

Spermathecal pores two pairs, between VII and VIII, and VIII and IX, nearly opposite but a little dorsad of the second seta or as the margins of the apertures are tumid about opposite the interval between the first and second setæ.

Hab.—Burrawang, N.S.W.

Possibly distinct from *P. fecunda*; but a satisfactory series of the latter is still a desideratum.

The following four species were each described from a few mostly small specimens at a time when there seemed to be no immediate prospect of obtaining further material; during the period which has since elapsed I have had the opportunity of examining better series, from the examination of which I am now able to offer the following remarks partly supplementary to, partly in correction of, my original descriptions.

CRYPTODRILUS SACCARIUS, Fl., P.L.S.N.S.W. (2), I. (1886), p. 951.

The original description of this species was drawn up from the examination of half a dozen small specimens from Hornsby, in which for several reasons the slight irregularity of the rows of setæ did not attract particular notice. From further observations on a few additional specimens from the same locality, on a good series of specimens of what I regard as belonging to the same species from another locality, and on two other lots of specimens of what I consider as varieties, I now offer the following supplementary remarks.

Setæ: the eight rows of setæ never quite straight and regular throughout, the irregularity varying however within rather wide limits in different individuals; where regular the two rows of each outer couple not quite so far apart as the two couples of each side; all the rows at first regular and the two rows of each inner (ventral) couple continuing so throughout with the exception of a seta here and there out of place, or only slightly irregular, for some little distance in front of the posterior extremity (i.e., in about

the posterior fourth or fifth of the body, except on about the last half dozen segments on which setæ are not visible) but with any tendency to irregularity more marked in the case of the second row of each of these couples; the rows of the two outer couples at first regular, in some specimens continuing so for a considerable distance (for the anterior half of the body, or even more) but sooner or later, or in others even on some of the preclitellar segments, the setæ of one or the other (most commonly the outer) and further back of both rows on each side of the body only here and there or continuously become displaced, at first slightly and then more and more markedly so that in about the hinder fourth or fifth of the body where always the two outer, and sometimes all four, rows of each side are out of place, the irregularity is sometimes very remarkable; the setæ of the same rows on different segments may be quite close or widely separated, the setæ of different rows sometimes alternating roughly for a few segments. In one specimen five setæ were present on one and four on the other side of the same segment. Even in worms without girdles and undeveloped male papillæ I have not noticed the inner couples of setæ on segment XVIII.

The ventral surface of segment XVIII in all but very young specimens is more or less modified, most marked in mature worms with well developed clitella in which (in spirit specimens) there is usually a rather broad but shallow transverse depression bounded by a tumid rim, most thickened just round and a little beyond the ends of the depression which reaches on each side to a little beyond the second row of setæ, the depression a little narrower (from before backwards) for a little way on each side of the median line of the body, then widening out towards the extremities thus bearing some resemblance in shape to a dumb-bell, the papillæ with the male pores in but not quite at the extremities of the enlarged ends corresponding in position with the interval between the setæ of the inner couples, and confluent with the posterior slope of the depression so that the depressed area passes in front and beyond them; sometimes a small papilla or only a little pit dorsad of each of the male papillæ. In less mature individuals the same arrangements are indicated but are less developed, the depression not extending so far from side to side, its margins not so tumid, and its shape not so well-defined, and lying closer to the anterior than to the posterior margin of the segment. On the other hand as some specimens have the ventral surface convex but thickened for a space outwards on each side as far as about the second row of setæ, the thickening most marked towards the ends of the thickened area (which sometimes is dumb-bell-shaped from the extremities encroaching a little) it may be that the depression referred to is only or chiefly post mortem and due to the unequal contraction of a not uniformly thickened surface. Out of about 100 (spirit) specimens by far the majority of them show at least some indication of it. Individual variations in detail are common, and very frequently in the median line just behind the anterior margin of the segment there is one or a pair of dots or pits on a more or less distinctly thickened area resembling the accessory copulatory structure, or there may be one median, and two lateral dots or pits, in front of the & papille. The supposed accessory copulatory structures vary in number, situation, and in pattern and size according to the extent to which they are developed. The first indication of each of them in immature worms is a pair (or there may be only one) of circular translucent dots or pore-like pits in the intersegmental groove (except in the case of those on the ventral surface of xVIII) one on either side of and not far from the median ventral line; on each side of the intersegmental groove a portion of the ventral surface of each segment becomes modified forming a lanceolate or nearly elliptical transverse thickening extending from the innermost (ventral) row of setæ on one side across the median ventral line to the innermost row of the other side, and from before backwards extending over one or part of one annulus or more of each pair of segments between which it occurs, the surface still completely traversed by the intersegmental furrow, or a portion of the latter completely enclosed; in more mature individuals the thickening increases, the pattern of the whole structure becoming more definite (lanceolate or nearly elliptical), the surface shallowly concave with an enclosing raised rim, or the

surface may be convex, in either case the dots or pits still visible on the surface. Sometimes the thickened areas are more elongate from side to side, and narrower from before backwards than at other times; sometimes the tissue only on one side of the intersegmental groove thickens; frequently the thickened area is constricted in the median line giving it a slight dumb-bell shape; sometimes the little pits are surrounded by a tumid rim irrespective of the general thickening or even become a pair of papilla; they are usually intersegmental structures but occasionally they appear to belong wholly to the posterior of the two segments involved, and to be only apparently intersegmental by encroachment. As regards number and situation, there may be two preclitellar ones between segments XI and XII, and XII and XIII; and four postclitellar, one between XVIII and XIX, and three between any two segments from xx-xxiv, besides another on the ventral surface of xviii, but some or any of them may be wanting; in my original specimens only the two preclitellar ones were present; in the subsequently acquired specimens a very common arrangement is one preclitellar one between XII and XIII, and two postclitellar ones between XX and XXI, and XXI and XXII, together with indications of something like them on xviii.

Dorsal pores: the first few are not at all conspicuous in the specimens examined; the first one appears to be between XI and XII, but there may be a rudimentary one between X and XI.

Alimentary canal: the gizzard in segment v; five pairs of calciferous pouches in IX-XIII, overlying the intestine.

Hab.—The eastern portion of the County of Cumberland north of Port Jackson, N.S.W.

C. saccarius var. montanus, var. nov.

Three moderately contracted spirit specimens 50-67 mm. long, 3-4 mm. broad; number of segments about 140-180.

Two without girdles have the ventral surface of XVIII convex and tumid, most marked on each side from a little ventrad to a little dorsad of the inner couples, the thickenings bulging a little

antero-posteriorly; the third has a narrow transverse depression with a raised vein very much as in some specimens of the typical form.

All three have the supposed accessory copulatory structures, two in front and one behind the clitellum, but the former and occasionally the latter instead of being intersegmental may occupy the posterior two-thirds of XII, XIII, and XXI, or becoming only accidentally intersegmental by encroachment.

Alimentary canal: six pairs of calciferous pouches in segments

In other respects, so far as I know at present, agreeing with the typical form.

Hab.—Springwood, Blue Mts.

The number of calciferous pouches appears to be constant in this variety. Externally there is little to distinguish it from the typical form.

C. saccarius var. robustus, var. nov.

Eight well preserved rather contracted (spirit) specimens 112-195 mm. long, 9-12 mm. broad; number of segments from about 250-290: another very young specimen 59 mm. long, 5-6 mm. broad; number of segments about 215.

Accessory copulatory structures: usually one between XII and XIII, and in one specimen a postclitellar one between XXI and XXII (they have probably not attained their maximum development in any of the specimens). The ventral surface of XVIII in some of the specimens without clitella shows a papilla-like thickening in the position of the second seta of each side (N.B., the inner couples as in the typical form not visible on XVIII); in more mature specimens the thickening has increased, and in the area corresponding with the interval between the inner couples the anterior and posterior annuli have become depressed, the middle portion remaining as a distinct papilla apparently with the very inconspicuous male pores which are about in line with or a little

dorsad of the second row (i.e. a little dorsad of the position they occupy in the typical forms); ventrad of the papillæ the depressions may become confluent, and in the most mature (but still immature) examples they extend inwards, while the ventral surface between the papillæ shows a tendency to become modified and the depressions to be bounded by a raised rim. Translucent dots or little pits are commonly present on XVIII, one or two on each side in front, and two or three on each side behind the papillæ, the latter nearer to the median line.

The spermathecal pores are in front and dorsad of the first setæ on the margins of VIII and IX, a little more dorsad than in the typical form.

Dorsal pores: the first one appears to be that between XII and XIII, though there sometimes appears to be a rudimentary one between XI and XII; the first not always readily made out in my specimens, and on the clitellum blocked up.

Alimentary canal: six pairs of calciferous pouches in VIII-XIII.

In other respects agreeing substantially as far as I know at present with the typical forms. From the condition of the clitellum, the accessory copulatory structures, and the ventral surface of XVIII, evidently none of the specimens are quite mature.

Hab.—Near Gosford, N.S.W.

With the exception perhaps of *C. Tryoni*, the larger examples referred to above are the finest and most robust earthworms I have yet seen belonging to the genus *Cryptodrilus*. Nevertheless except in regard to size, the body comprising a few more segments, and the very slightly more dorsally situated male and spermathecal pores I am unable to make out any satisfactory important points of external difference from the typical forms. Irrespective of the presence of an additional pair of calciferous pouches there are so many points of agreement that, with var. *montanus* as an intermediate link, at present it seems to me to be best considered as a local variety inhabiting the rich soil of the brushes, the typical form and the var. *montanus* occurring in areas of good but much poorer soil, in the Hawkesbury sandstone area.

Perichæta tenax, Fl., l.c. (2), I. (1886), p. 953.

Ten good average (spirit) specimens out of about thirty are from 101-157 mm. long, 5-6 mm. broad; number of segments from about 116-150.

Setæ: when all are in place 36 may be counted on the first setigerous segment (II), which number continues for some distance until just behind the clitellum where 40 may often be counted; in the posterior region except on the last few segments the number may increase to about 50 or 60; fewer than the numbers specified may be met with in individual cases.

Clitellum comprises segments XIV-XVII and part of XIII.

Accessory copulatory structures: the characteristic structures present on IX and X may extend outwards on each side as far as the third or fourth setæ (i.e., further out than previously mentioned) and in one case there is an additional one on x1; they vary somewhat in regard to the extent to which they are developed, and occasionally extend only half-way (antero-posteriorly) across the segment. In addition to these there are certain other structures often only represented by vaguely defined swellings; on the ventral surface of xVII and of XIX is a pair of circular depressions, one on either side of and not far from the median line and immediately in front of a line joining the first (ventral) seta on each side, each surrounded by a more or less circular tumid rim, the two of each pair merely contiguous or more or less confluent; and often a single median one on XVIII. In sexually mature worms the papillæ carrying the male pores are situated (in spirit specimens) on the inner aspect (probably more evident owing to shrinkage in the middle) of two much bigger swellings extending antero-posteriorly across the segment, frequently pitted; in immature worms one may find an earlier stage showing five little pits with tumid surroundings forming an interrupted ridge, of which the middle one persists without much alteration, the first on each side of it being a male pore with its rudimentary papilla, and the second eventually becoming so much developed as to overshadow the papillæ of the 3 pores.

Hab.—The County of Cumberland; Springwood, Blue Mts., N.S.W.

Perichæta dorsalis, Fl., l.c. (2) II, (1887), p. 618.

A good series of 35 specimens of various sizes, some very successfully killed in a fairly extended condition by Mr. Smith, comprising examples from 60 mm. long, 3 mm. broad (juv.) to 192 mm. long, 5-7 mm. broad; number of segments about 135.

Setæ: the full number (probably about 16) not present on the first setigerous segment (II) in any of the specimens, though a few have six setæ visible on at least one side of the body; the first and second (counting from the ventral ends of the half series) are rarely absent, and these may be the only ones visible; the next few segments usually have 16, increasing to 20 about segment vi; in one of the original specimens there are 12 on one side of segment XII, but this number is exceptional so far forward; still further back, except on about the last six or seven segments which are smooth, there may be about 30 or a few more. Fewer setæ than the numbers specified may be met with. The statement that the dorsal interval devoid of setæ is somewhat narrower than the ventral one applies only to the posterior region, or elsewhere only to particular individuals; as a rule anteriorly the dorsal interval is much broader than and not so well defined as the ventral one. its bounding rows of setæ not being straight since the setæ are not always at equal distances apart even on the same segment, or that some of them are absent, or posteriorly to the increasing number of setæ. The ventral interval is well-defined, its bounding rows straight and regular, the setæ in this region without the varying tendency to be absent so characteristic of those in the dorsal region. Even in young worms without clitella or papillæ however the first two or three setæ on each side of the ventral surface of XVIII are not visible, and are probably normally absent.

Genital pores: in worms in which the papillæ are not much developed the male pores are two conspicuous slit-like pores a little dorsad of what would be the position of the second seta on

each side, and corresponding with the interval between the second and third setæ; in mature worms the ventral surface of segment XVIII on each side from about the position of the first to the fourth seta all round the male pores is very tumid forming a conspicuous papilla bulging somewhat both forwards and backwards, more or less concentrically furrowed; and from the male pores there protrude what are probably functionally penial organs, though they appear to be only the proximal portions of the genital ducts everted. The oviduct pore is single (not as previously stated); the spermathecal pores are more dorsally situated than in any species I have yet seen; owing to the irregularity of the setæ they are not always "in line with about the eighth setæ," but may be as far dorsad as opposite the interval between the ninth and tenth setæ.

The supposed accessory copulatory structures on x and xI present in the largest of the original specimens are absent.

Genitalia: in addition to the three pairs of vesiculæ seminales in IX, XI, and XII there may be two additional rudimentary pairs in XIII, and XIV (unless the last of these, situated on the posterior face of the septum between XIII and XIV below and at the sides of the alimentary canal, should be appendages of the oviducts). The long cæca of the spermathecæ may be much longer than the pouches.

· Hab.—Eltham, Victoria (collected by Mr. W. W. Smith).

In addition to the fine series of worms, Mr. Smith, who is a most enthusiastic observer of earthworms, very kindly sent me a number of the cocoons together with portions of the burrows, respecting which I give the following extracts from his letter:— "I send you fragments of the burrows of P. dorsalis with cocoons in situ to show their position with regard to the burrows. Several writers on the subject maintain that they are found in the burrows themselves, but I have never yet met with a single instance of such a thing, although I have examined hundreds of the burrows of New Zealand worms. You will see from the fragments sent that the cocoons are deposited by the worms on an average about

half an inch from the burrows in little cavities which are afterwards neatly packed with voided earth, forming moist chambers." The cocoons sent varied slightly in shape from nearly spherical to ovate, or almost elliptical, from 5×4.5 mm. to 6×4 mm.; colour yellow or dull yellowish-brown; usually with one end slightly drawn out; one cocoon contained an embryo 15 mm. long; the others had been more recently deposited, but owing to an unfortunate accident which befel them I am unable to give any further particulars respecting them. These are the only cocoons of Australian earthworms I have yet seen, as though I have collected extensively I have not so far had the good fortune to meet with them.

PERICHÆTA STIRLINGI, Fl., l.c. (2), II. (1887), p. 395.

An additional series of 14 good specimens very successfully killed in a fairly extended state by Mr. Zietz comprises examples from 105 mm. long, 3-4 mm. broad (juv.) to 220 mm. long, 9-10 mm. broad; number of segments 120-190-200 segments.

Setæ: the full number (probably about 24) not present on the first setigerous segment (II) in any of the specimens, though a few have 10 on at least one side of the body, but even then one or two are probably missing, the tenth seta (counting from the ventral surface) not being so near the mid-dorsal line as the uppermost setæ on succeeding segments; on the next two segments 12 or 13 may be met with at least on one side; on the following segments for some distance the number may increase to 14 on one or both sides; still further back 16-18 may occur on one or both sides, and quite posteriorly the total number may increase to 40 or a few more per segment. As in other species fewer setæ than the numbers specified for the different regions may frequently be met with; and while the variation in number on some segments is evidently due to the mere accidental absence of setæ owing to breakage or wear and tear, in other cases it is owing to the frequent absence of one or two or more of the uppermost (dorsal) setæ of the half-series, and this in the absence of any definite information as to the dorsal rows being more exposed to wear and tear than the ventral ones seems to be attributable to a tendency to a reduction in the number of setæ commencing with those in the dorsal region, as the ventral setæ and especially the first and second of each half series are remarkably constant in their presence even on segment II, on which sometimes the total number visible is only three or four.

The ventral interval devoid of setæ is very well marked throughout, but anteriorly where the setæ are fewer and further apart, and as elsewhere, not always at equal distances apart even on the same segment, its width may be much less than that of an ordinary interval between two setæ. The dorsal interval is narrower.

In mature worms in which the ventral surface of XVIII is more or less modified the first visible seta on each side is usually the third or fourth (counting from the ventral ends of the half-series); in an immature specimen on which the surface of this segment is unmodified and the 3 pores quite distinct the first two on each side are wanting or invisible, and the pores are seen to be in what would be the interval between the second and third setæ but a little dorsad of the position of the first setæ; from the unequal distances between the setæ, or from the third or fourth setæ being hidden by the tumidity of the ventral surface, one is often obliged to judge of their position by that of the setæ on the preceding or succeeding segment, and then the pores sometimes seem to correspond with the interval between the third and fourth setæ. The oviduct pore is single and median (not two pores as previously stated); owing to the irregularity of the setæ the spermathecal pores are sometimes opposite the intervals between the fourth and fifth or more usually the fifth and sixth setæ.

Dorsal pores commence after segment IV.

In mature worms the tissue round the male pores becomes modified, or they are surrounded by a tumidity connecting the accessory copulatory papillæ of the second and third pairs on each side.

Genitalia: two pairs of testes and two pairs of ciliated rosettes in x and xI; three pairs of vesiculæ in xI-XIII (in XIV there may

be what look like a rudimentary fourth pair); the genital duct in the additional specimens dissected is rather long and several times bent on itself, and the two vasa deferentia of each side appear to remain separate and to join the prostatic duct about half the length of the latter from the gland. The spermathecal cæca may be as long or a little longer than the duct of the main pouch.

The numerous nephridial tubules lie just behind the insertions of the mesenteries.

Hab.—(As previously) near Adelaide, S.A. (Coll. S.A. Museum, Adelaide).

NOTES ON A NEW SPECIES OF EUCALYPTUS

(E. MAIDENI) FROM SOUTHERN NEW SOUTH WALES.

By Baron von Mueller, K.C.M.G., M. & Ph.D., F.R.S., &c.
(Plates xxvIII. and xxIX.).

Finally tall; branchlets slender, quadrangular at the end; leaves scattered, of rather thick consistence, copiously dotted, narrowelongate or sometimes broad-lanceolar, distinctly or somewhat sickle-shaped; the petioles from $\frac{1}{2}$ to 1 inch in length, the lateral veins spreading and slightly prominent underneath, the circumferential vein distinct and rather remote from the edge of the leaf; young shoots quadrangular, their leaves broadly cordate with a small pointed apex, opposite and of a whitish hue underneath, petioles almost absent; umbels axillary, on angular stalks about ½ inch long, dilated towards the top, bearing 2 to 9 flowers of rather large size, stalklets none or exceedingly short; calyx-tube obconical, angular, warty-glandular, especially at the base; lid depressed hemispherical, suddenly raised in the centre to a thick point, like the calyx-tube warty-glandular; stamens all fertile, inflexed before expansion; anthers oblong kidneyshaped; stigma slightly broader than the style, depressed; ovulary 3- to 5-celled; fruit \(\frac{1}{4} \) inch in thickness, nearly hemispherical, its rim broad, convex, at the edge separated from the calyx-tube by an ample furrow; seeds all without any appendage, the sterile narrower and longer than the fertile seeds.

In rich soil only on steep mountain-slopes from the southern boundary as far north as the Braidwood and Nelligen districts (W. Bäuerlen).

A tree, locally known as White, Blue or Spotted Gum; in favourable situations attaining a height of 200 feet and a diameter of 4 feet. Stem usually very straight, and much elongated. Bark smooth and usually bluish or greyish, sometimes with long drawn patches or spots, sometimes rather white, at other times of a dull ochre-yellow colour. In general appearance the tree and bark resemble a good deal that of Euc. goniocalyx, so much so that on mountain-slopes, where both species promiscuously occur, it is difficult to distinguish the one from the other, when so situated, that the fruit on the ground is so mixed, that it can not be traced with certainty to its particular tree. If however leaves of the young state can be seen, then the distinction is easy enough, as those of Euc. goniocalyx are never quite so broad nor of such chalk-like whiteness. Where the fruit can be traced, no mistake can be made, as they are so widely different, and resemble more those of E. globulus.

It has very little kino, and from that fact one would judge, that it is a good timber. Somehow or other it is not much used, which is, no doubt, to a certain extent owing to its situation, mostly difficult of access, and also to the fact, that in situations where it occurs, other valuable and time-proved timbers do occur, such as E. tereticornis, E. hemiphloia, E. goniocalyx, E. melliodora, E. eugenioides, etc. The timber is, however, used for fencing, both for rails and posts, also for rough building purposes and to a certain extent for wheelwright work. As posts, it is said, it lasts fairly well, and it makes excellent rails. The timber is very heavy, hard and of a rather pleasing yellow colour, not somewhat brownish as that of E. goniocalyx.

EXPLANATION OF PLATES.

(PLATE XXVIII.)

Fig. 1.—Twig with expanded flowers, buds, leaves and fruits.
(Nat. size.)

Fig. 2.—Calyx-tube with lid uplifted.

PLATE XXVIII.—continued:

Fig. 3.—Longitudinal section of an unopened flower.

Fig. 4.—Transverse section of ovulary.

Fig. 5.-Flower, expanded.

Fig. 6.-Anthers with filaments.

Fig. 7.—Transverse section of fruit.

Fig. 8.—Sterile seeds.

Fig. 9.-Fertile seeds.

(Figs 2-9 enlarged.)

(PLATE XXIX.)

Fig. 1.—Leaf of adult tree. (Nat. size.)

Fig. 2.—Young shoot with leaves. (Nat. size.)

Fig. 3.—Part of leaf showing venules and oildots. (Enlarged.)



NOTES ON A SMALL COLLECTION OF BIRDS MADE BY MR. E. H. SAUNDERS, AT ROEBURNE, NORTH-WESTERN, AUSTRALIA.

By A. J. NORTH, F.L.S.

Roeburne, of which Cossack is the port, is the centre of the pearling industry in North-western Australia. It is situated near the mouth of the Harding River, and is about 800 miles in a direct line from Perth, and 500 miles from Derby, King's Sound. The adjacent country is rich in minerals; gold was accidentally discovered there early last year by a boy, who picking up a stone to throw at a bird, found it to be closely veined with gold. Inland the country has been mostly devoted to pastoral purposes, the exact locality where this collection was made being Karratha Station, 36 miles N.W. of Roeburne. With one or two exceptions only the larger species have been collected, and although a new locality, only two species are recorded as typical of Western Australia, viz., Platycercus zonarius, Shaw, common in the south, and Dacelo cervina, Gould, already reported by Dr. Ramsay, from Derby. The rest are common in New South Wales and other parts of Australia, and merely show the range of the species. Mr. Saunders has attached a note to each specimen, giving the date when collected, sex, and the colours of those parts liable to fade.

CIRCUS ASSIMILIS, Jardine and Selby (C. jardinii, Gould).

Allied Harrier.

A semi-adult 3 shot May 3rd, 1889. Found over the greater portion of Australia.

HALIAETUS LEUCOGASTER, Gmelin. White-bellied Sea-eagle.

A young & shot near a lagoon, May 15th.

Mr. Saunders attached the following note to this specimen. "Contents of stomach, eels. The reason I believed the contents of the stomach to be eels, was because the bird's feet were covered with mud when shot. The lagoon called "Marie" is a large one and eels are numerous. I could not discern the heads of the eels taken from stomach."

HALIASTUR SPHENURUS, Vieillot. Whistling Eagle.

A single specimen of this bird, a young male. With the exception of the extreme south this species is universally dispersed over the Continent of Australia.

ELANUS AXILLARIS, Latham. Black-shouldered Kite.

An adult Q, similar in every respect to our New South Wales examples.

HIERACIDEA ORIENTALIS, Schlegel. Brown Hawk.

A single specimen, not quite adult male, shot May 2nd at Karratha Station. Similar in every respect to specimens from the eastern coast.

TINNUNCULUS CENCHROIDES, Vig. & Horsf. Nankeen Kestrel.

Adult specimens, 3 and Q, similar in tints of plumage and admeasurements to New South Wales examples.

MEROPS ORNATUS, Latham. Bee-eater.

An adult & specimen, shot April 29th at Karratha Station. This bird is universally distributed over the whole of Australia.

DACELO CERVINA, Gould. Fawn-breasted Kingfisher.

Two adult specimens obtained, \mathcal{J} and \mathcal{Q} , of this northern and north-western form of D. leachii. In both of these species the deep rich blue of the upper surface of the two central tail feathers of the male will at once serve to distinguish it from the female, which in striking contrast has the central tail feathers of a rich brown conspicuously barred with black.

HALCYON SANCTUS, Vig. & Horsf. Sacred Kingfisher.

One adult and one semi-adult \mathcal{J} . Similar to the New South Wales examples. Found all over Australia.

Centropus Phasianus, Latham. Pheasant-Coucal.

A single adult & specimen shot May 1st at Karratha Station. This species is precisely similar to that obtained on the Clarence and Richmond Rivers, some specimens varying more or less in the deeper tints of the under surface of the body.

Calopsittacus novæ-hollandiæ, *Gmelin*. Cockatoo-Parrakeet.

Two males, not quite adult.

PLATYCERCUS ZONARIUS, Shaw. Banded Parrakeet.

Two semi-adult Q specimens. This bird is the only typical Western Australian species in the collection. Although very common in portions of Southern and Western Australia, neither this nor any other species of *Platycercus* has been recorded in Dr. Ramsay's List of Birds from Derby.

ÆGIALITIS NIGRIFRONS, Cuvier. Black-fronted Dotterel.

Two adult specimens, \eth and Q, shot May 3rd. With the exception of the extreme north this bird is universally dispersed over the whole of Australia.

ARDEA NOVÆ-HOLLANDIÆ, Latham. White-fronted Heron.

An adult Q similar in every respect to New South Wales examples. With the exception of the Gulf district and Cape York this bird is found all over Australia.

TRIBONYX VENTRALIS, Gould. Black-tailed Tribonyx.

Three specimens shot April 23rd, two adult males and one female, similar in tints of plumage and admeasurements to those obtained from other portions of the Australian Continent.

FULICA AUSTRALIS, Gould. Australian Coot.

A 3 shot April 24th. After careful comparison with specimens from New South Wales and Victoria, I can find no distinction between them.

PLOTUS NOVÆ-HOLLANDIÆ, Gould. New Holland Darter.

An adult & shot April 29th. This bird seems to be universally dispersed over the whole of Australia. Dr. Ramsay has recorded both this and the two following species from Derby, Northwestern Australia (P.L.S.N.S.W. Vol. II. 2nd Series, p. 173) but through an oversight they have been omitted from his "Tabular List of the Birds of Australia."

GRACULUS MELANOLEUCUS, Vieillot. Little Cormorant.

One specimen, a female, shot May 17th at "Marie," a lagoon 36 miles S.W. of Roeburne. Similar to those procured from other portions of Australia and Tasmania.

GRACULUS STICTOCEPHALUS, Bonaparte. Little Black Cormorant.

Two adult specimens, \mathcal{J} and \mathcal{Q} , shot May 10th at Karratha Station. With the exception of the extreme north, this species has been obtained from every part of Australia.

DESCRIPTION OF A NEW SNAKE BELONGING TO $\begin{tabular}{ll} THE & GENUS & HOPLOCEPHALUS. \\ \end{tabular} .$

By J. Douglas Ogilby, F.L.S.

Hoplocephalus frontalis, sp.nov.

Scales in nineteen rows; abdominal plates 154; anal plate undivided; sub-caudal plates 30. Body elongate and rounded, tail short, terminating in a strong spinate scale; head small, but little distinct from the trunk; muzzle short, broad, and rounded; eye small, the pupil sub-elliptical. Rostral shield twice as broad as high, rounded above, and slightly bent backward between the anterior frontals, which are of moderate size and broader than long; posterior frontals much larger, as broad as long, obtusely angulate posteriorly, and bent downwards on the side of the head so much so as to form a broad suture with the second upper labial; nasal shield triangular, small; vertical hexagonal, rather longer than broad, with the outer margins slightly convergent behind, the anterior angle very obtuse, and the posterior rounded; supra ciliary large; occipitals large, rounded posteriorly; one anterior ocular, just reaching to the upper surface of the head; two posterior oculars, the lower of which is the larger; temporal shields in two series, the lower shield of the anterior series in contact with both post-oculars; six upper labials, the third and fourth bordering the eye; mental shield acutely angulated posteriorly; anterior chin shields rather larger than the posterior; many small scales between the chin shields and the first abdominal plate. Four small teeth behind the poison-fang. Light brown above each of the scales narrowly margined with black, so as to give the appearance of network; a broad black nuchal collar, extending forwards over portions of the upper labials, temporals, and the lower posterior ocular to the eye; a black spot in front of the eye on the upper third of the second and third upper labials; a black vertebral band, one scale in width, not continued on the tail; lower head shields grey with irregular dusky blotches; under surface pearly white, the abdominal plates with a broad bronze-colored median band.

This handsome and very distinct species was presented lately to the Australian Museum by Mr. J. Mozeley, who obtained it at Narrabri; its total length is 15½ inches, of which the tail measures less than 2 inches, or one-eighth of the total. In the great lateral extension of the posterior oculars this species approaches Dr. Günther's genus *Rhinelaps* which in all probability will eventually have to be merged in *Hoplocephalus*. Register number R. 655.

NOTES AND EXHIBITS.

Mr. Ogilby exhibited (1) a very handsome Lizard (Lygosoma—Homolepida—casuarinæ, D. & B.) from Wentworth Falls, and remarked that it was the largest species of the genus, exceeding even Lygosoma—Hinulia—lesueuri in size; also that he considers it a scarce species; (2) a young specimen of Hoplocephalus ornatus, De Vis; (3) Holocanthus tibicen, C.V., a fish new to the Australian fauna, and apparently scarce everywhere, recently brought from Lord Howe Island by the Visiting Magistrate, Mr. Icely; Mr. Ogilby further remarked that in the small collection brought by that gentleman no less than seven species are hitherto unrecorded from the island, namely Holocanthus tibicen, Chironemus marmoratus, Trachynotus russelli, Brama rayi, Pegasus draco, Cristiceps australis, and an Ophichthys.

Mr. Etheridge exhibited specimens of the fossils dealt with in his paper.

Mr. Trebeck showed an exhibit of wool which, originally a low class dirty wool, by a process followed in Germany had been immensely improved and converted into what is technically known as "tops."

Mr. North exhibited the birds mentioned in his paper, and also drew attention to the number of Australian Finches now in the Sydney Market, among which he pointed out several rarities, viz.: Donacicola pectoralis, Gould; Poëphila mirabilis, Homb. et Jacq.; Pöephila leucotis, Gould; and Bathilda ruficauda, Gould, obtained midway between Townsville and Normanton, Northern Queensland.

Mr. North also communicated the following "Note on the successful hatching of an egg of the Emu, *Dromaius novæ-hollandiæ*, under a domestic fowl":—

"I beg to bring under the notice of the members of this Society the success attending the hatching of an emu egg under a domestic fowl. Mrs. M. Walker, of Newtown, Sydney, has in her possession a pair of emus, Dromaius novæ-hollandiæ, obtained from Queensland; early in July last the female laid several eggs, one of which was by way of experiment placed under a common barn-door fowl on the 15th of July. The hen sat very well for two weeks, when she became restless, and another one was immediately put in her place, the egg being regularly turned every morning, as it was too cumbersome for the fowl. On the 2nd of September, the young bird emerged from the shell, strong and healthy, and was thriving very well, till turned out upon a grass plot for a run seventeen days after, when it was attacked by one of the emus and never recovered. The exact period of incubation would therefore in this case appear to be seven weeks. The young bird and remaining portions of the egg-shell which I exhibit here to-night have been presented by Mrs. Walker to the trustees of the Australian Museum. The female is now sitting on six eggs, and five others have been placed in an incubator; the last egg laid is of a deep bluishgreen, perfectly smooth and free from granulation."

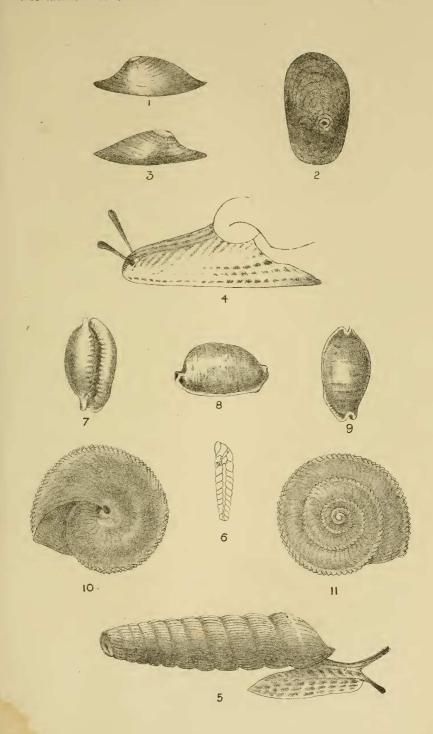
Mr. Brazier exhibited the Mollusca trawled by Mr. Smithers off Merimbula, and *Crassatella pulchra*, Reeve, found by Mr. E. Richards, of Ballina, Richmond River.

Dr. Ramsay exhibited two mounted specimens of a new species of *Belideus* about the size of *B. flaviventer*, but of a light ashy gray colour, almost white on the proximal portion of the tail, which is thick, bushy and well covered with long hair to the tip; the under surface of the body is white. These specimens have been recently received from the Museum collectors, Messrs. Cairn and Grant, who obtained them with other new species of Phalangers on the Bellenden Ker Ranges, North Eastern Queensland. The *Belideus* will be described under the name of *B. cinereus*.

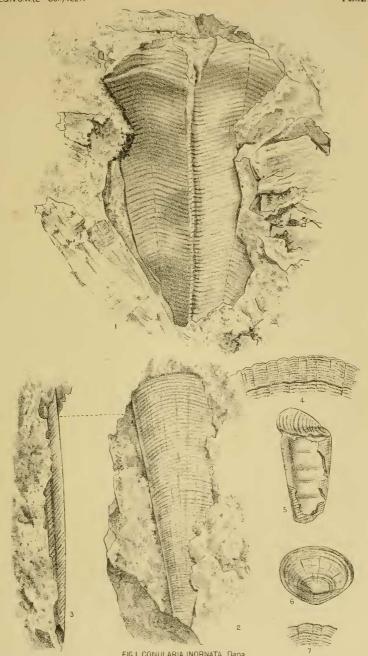
Dr. Ramsay also exhibited a new species of *Pseudochirus* (Phalanger) with a remarkably short head and long bushy tail, for which the specific name of *breviceps* has been proposed.

Mr. Skuse exhibited specimens of the Tipulidæ described in his paper.

Also specimens of a minute Dipterous fly, *Phytomyza* (sp.n.), bred from the leaf of *Clematis aristata*, obtained in the beginning of the present month by Mr. J. J. Fletcher. The larvæ make long irregular white galleries beneath the upper cuticle of the leaf, where they undergo their metamorphoses.



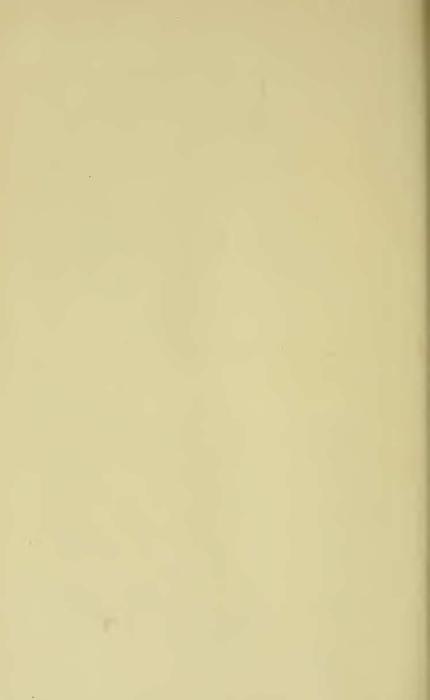


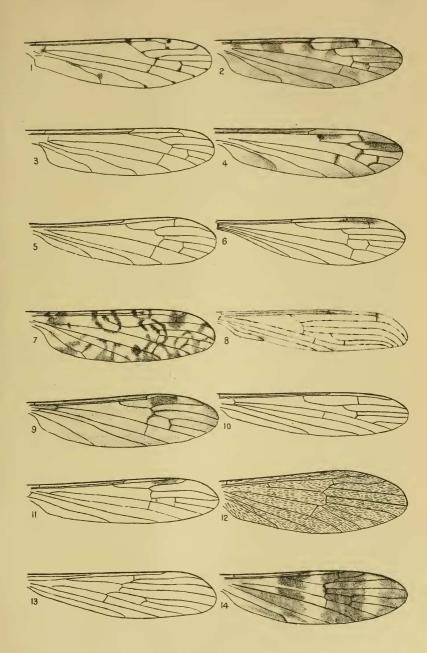


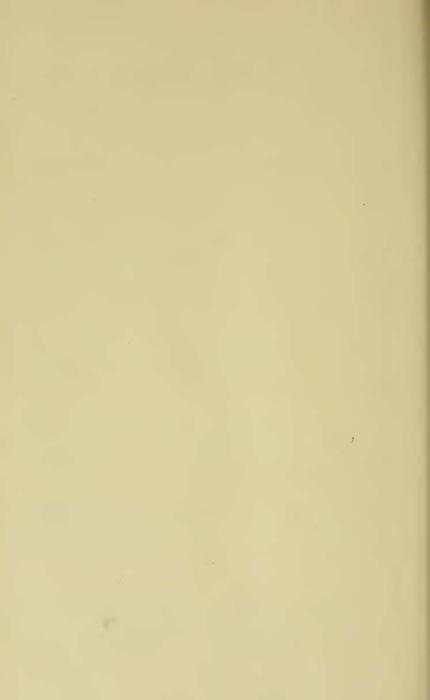
PT.Hammond, delad net

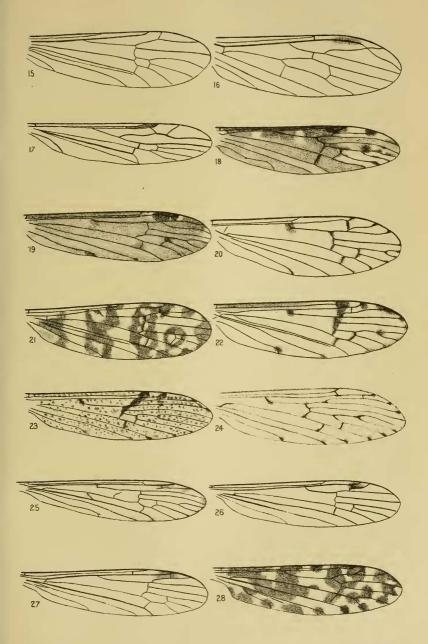
FIG.2 -7. HYOLITHES LANCEOLATUS, Morris, sp

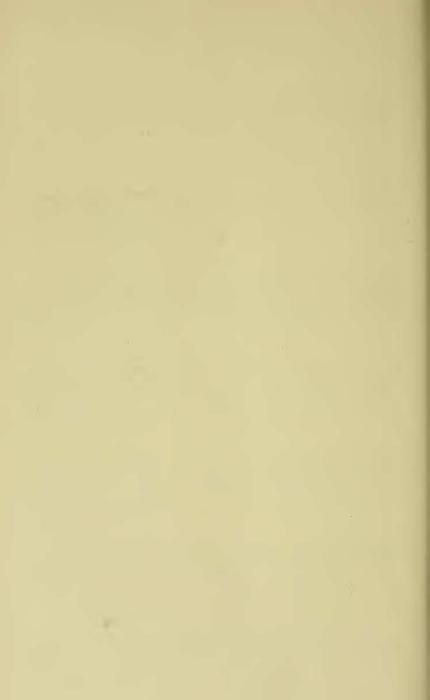
Baron & Gatward, lith

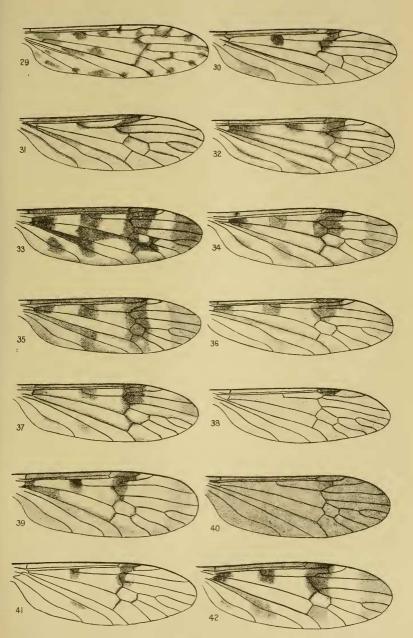






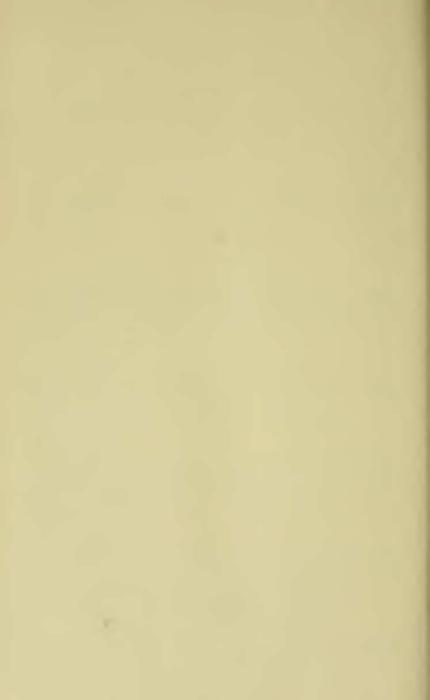


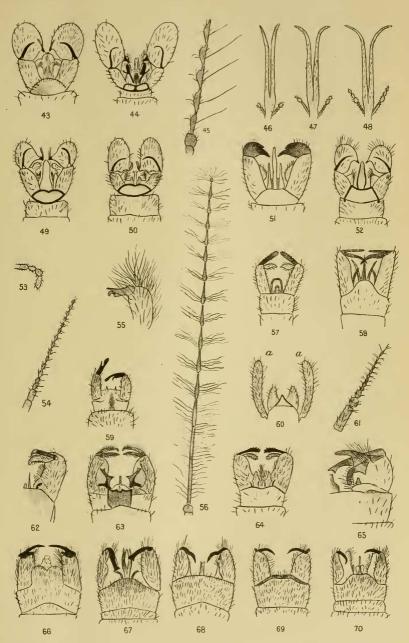




FAA Skuse, del.

Baron & Gatward lith

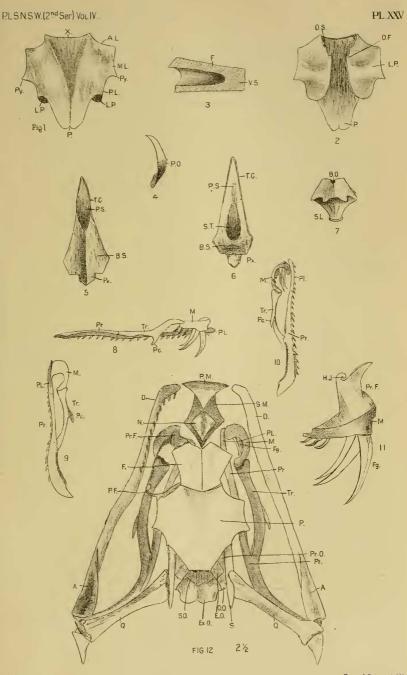




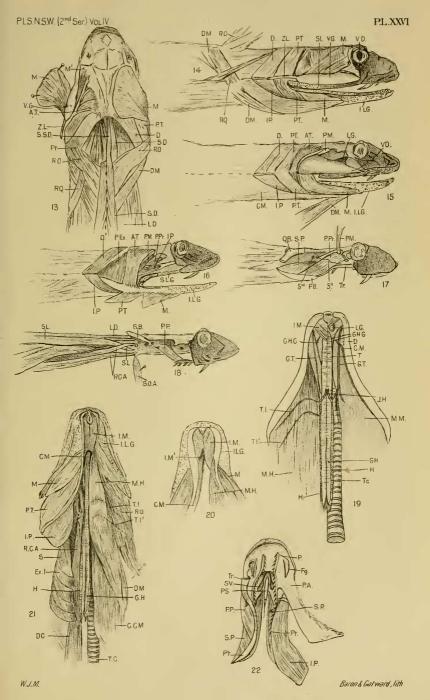
F.A.A.Skuse, del.

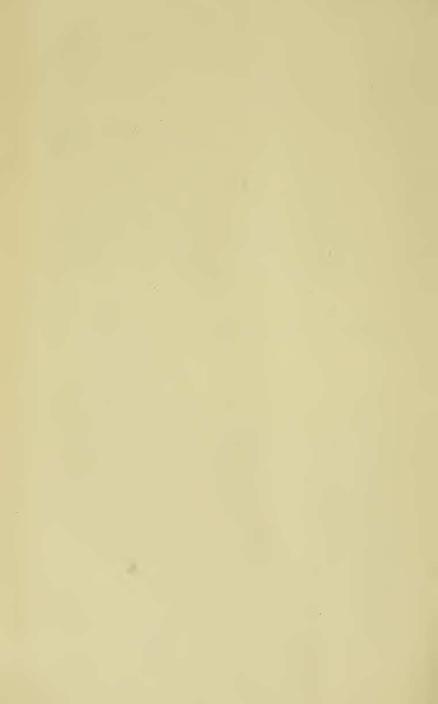
Baron & Gatward, lith.

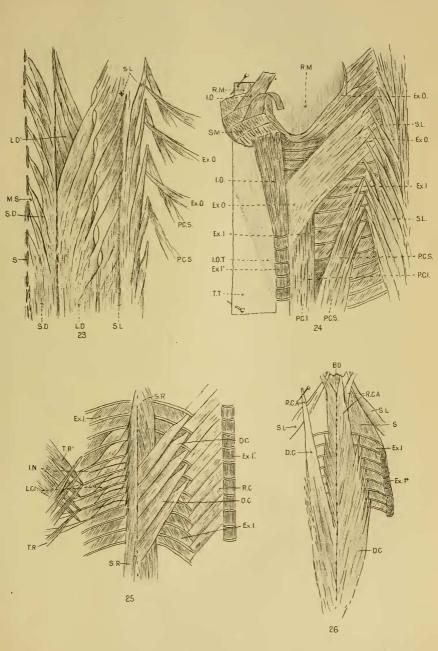






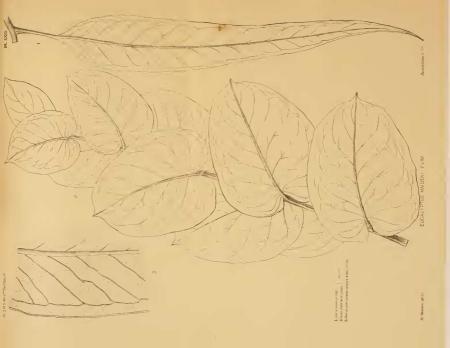














WEDNESDAY, 30TH OCTOBER, 1889.

The President, Professor Stephens, M.A., F.G.S., in the Chair.

Mr. Bäuerlen was present as a visitor.

The President stated that it became his painful duty to announce to the Members of the Society the death of the Rev. Julian E. Tenison Woods, F.L.S., F.G.S., a Vice-President of the Society, on the 7th instant. The late reverend gentleman was elected a Corresponding Member in 1876, became subsequently a full member, and in 1879 and 1880 filled the Presidential Chair. Throughout his long residence in Australia he was an active and enthusiastic worker in the fields of Biology and Geology, and he contributed a considerable number of valuable papers to the various Colonial Scientific Societies' Journals.

DONATIONS.

"Mémoires (Sapiski) de la Société des Naturalistes de la Nouvelle-Russie, Odessa." Tome XIV., Part 1 (1889); "Sapiski Matematischeskago, &c." Tome IX. (1889). From the Society.

"Zoologischer Anzeiger." XII. Jahrg., Nos. 314-316 (1889). From the Editor.

"Revista de Sciencias Naturaes e Sociaes orgão dos trabalhos da Sociedade Carlos Ribeiro." Vol. I., No. 2 (1889). From the Society.

A Pamphlet entitled "A new Hepatic." By Dr. B. Carrington and W. H. Pearson. From W. H. Pearson, Esq.

"Papers and Proceedings of the Royal Society of Tasmania for 1888;" "Abstract of Proceedings, Aug. 19th and Sept. 9th, 1889;" "Report for the year 1888." From the Society.

"The Gold-Fields of Victoria.—Reports of the Mining Registrars for the quarter ended 30th June, 1889;" "Report of the Secretary for Mines on the Mineral Statistics of Victoria for the year 1888." From the Secretary for Mines, Melbourne.

"The Journal of the Bombay Natural History Society." Vol. IV., No. 2 (1889). From the Society.

Feuille des Jeunes Naturalistes." No. 227 (Sept., 1889); "Catalogue de la Bibliothèque." Fasc. No. 6 (1889). From the Editor.

"Results of Meteorological Observations made in N.S.W., during 1887, under the direction of H. C. Russell, B.A., F.R.S;" Three Pamphlets from the "Proceedings of the Aust. Assoc. for the Adv. of Science, 1888." By H. C. Russell, B.A., F.R.S. From the Government Astronomer.

"The Victorian Naturalist." Vol. VI., No. 6 (October, 1889). From the Field Naturalists' Club of Victoria.

"Bulletin of the Museum of Comparative Zoology at Harvard College, Cambridge, U.S.A." Vol. XVII., No. 4 (1889). From the Curator.

"The Chemist and Druggist." Vol. XXXV., No. 490 (1889); "The Chemist and Druggist of Australasia." Vol. IV., No. 10 (Oct., 1889). From the Publisher.

A Pamphlet entitled "Notes on the Discovery of a Ganoid Fish in the Knocklofty Sandstones, Hobart." By Messrs. R. M. Johnston and A. Morton. From Alexander Morton, Esq.

- "Proceedings of the United States National Museum." Vol. XI. (1888), Sheets 28-33. From the Museum.
- "The Canadian Record of Science." Vol. III., No. 7 (1889). From the Natural History Society of Montreal.
- "Records of the Geological Survey of India." Vol. XXII., Part 3 (1889). From the Director.
- "The Australasian Journal of Pharmacy." Vol. IV., No 46 (Oct., 1889). From the Editor.
- "The Journal of Conchology." Vol. VI., No. 3 (1889). From the Conchological Society of Great Britain and Ireland.
- "Mittheilungen aus der Zoologischen Station zu Neapel." Bd. IX., Heft. 1 (1889). From the Zoological Station.
- "Annales de la Société Géologique de Belgique." Tomes XIV., Liv. 2; XVI., Liv. 1 (1889). From the Society.
- "Bulletin de la Société Zoologique de France pour l'Année 1889." Tome XIV., No. 6 (1889). From the Society.
- "Comptes Rendus des Séances de l'Académie des Sciences, Paris." Tome CIX., Nos. 4-7 (1889). From the Academy.
- "Annual Report of the Trustees of the Queensland Museum, 1888." From the Curator.
- "The Proceedings of the Royal Society of Queensland, 1889." Vol. VI., Part 5. From the Society.
- A Pamphlet entitled "The Physiography of the Australian Alps." By James Stirling, F.G.S., F.L.S. From the Author.
- "Transactions and Proceedings of the New Zealand Institute, 1887." Vol. XX. From the Institute.
- A Pamphlet entitled "Bryozoa from New South Wales." By Arthur W. Waters. From the Author.

PAPERS READ :-

DESCRIPTIONS OF TWO LIZARDS OF GENERA NEW TO AUSTRALIAN HERPETOLOGY.

BY C. W. DE VIS, M.A.

SCINCIDÆ.

Tropidophorus Queenslandiæ, n.sp.

Anterior head-shields rugose; those of the parietal and occipital regions nearly smooth. Frontonasals two, thick, convex, deeply sulcated. An azygos shield between the prefrontals; prefrontals and anterior portion of frontal similar. Prefrontals and frontals together about equal in length to the shields posterior to them. The frontals porous in structure microscopically, thin, with a few minute irregularly disposed raised lines and tubercles on the surface; the shields rather obscurely defined as frontoparietals (two), interparietal and occipitals: the interparietal a little longer than the frontoparietal and with the "pineal eye" speck as a glistening, apparently semitranslucent cornea contrasting with the surrounding surface. Supraoculars five, subequal, strongly ribbed longitudinally; supraciliaries seven, limited posteriorly by the last and smallest supraocular; a row of keeled scales below the eve. Upper labials five. An azygos postmental. Tympanum as long as the eye-slit. Scales in 32-34 rows; dorsals in 10 rows, of which the median rows are the smallest, the laterals largest; all with strong tectiform keels forming continuous subspinose lines. Scales of the flanks smaller than the lateral dorsals, similarly keeled, in longitudinal lines; of the upper surface of the tail much larger, more feebly keeled but mucronate and forming spinous ridges; of the temples like those of the middle of the back; of

the throat and sides of the neck small and similarly keeled; of the abdomen as large as the lateral dorsals but with linear central keels becoming mucronate on the lower surface of the tail. Two large preanals. Tail rounded: about a fourth longer than the head and body. Subdigital lamellæ simple. The protracted hind limb reaches the retracted elbow. Teeth obtuse, molar-like. Dark brown above, with faint alternate cross-bands of paler brown and fuscous; beneath pale dingy brown. Chin dark brown with white band-like spots; preanals white; base of tail beneath marbled with white. Total length 125 mm., tail 70, head 17, width of head 9, of body 11, fore limb 17, hind limb 25.

Locality.—Herberton and Bellenden Ker, in scrubs.

The nearest relative of this lizard is *T. grayi*, Gth., of the Philippine Islands. The obtuseness of the teeth and rudimentary conditions of the posterior head-shields may possibly lead to the establishment of a new genus for its reception.

GECKONIDÆ.

Perochirus mestoni, n.sp.

Head rather depressed, a little convex on the frontal and concave on the parietal region. Snout obtusely pointed, longer than the postocular portion of the head and nearly twice the diameter of the eye. Body rotund, limbs short and massive; digits short, broad, almost free and all dilated; the thumb and outer toe moderately developed and furnished with very small claws; the free phalanges of the fourth toe much shorter than the diameter of the eye. Ear opening small, round. Rostral (injured) apparently thrice as broad as high; mental subrhomboidal, its posterior angle entering between a pair of moderately elongate postmentals which are followed by a pair of smaller ones; between these are granular scales larger than those of the throat. Head with granules which are larger on the snout than on the crown. Upper surface and throat with small granules somewhat larger than those of the

erown. Abdomen with imbricated scales of moderate size. Tail, if not reproduced, round, fusiform, tapering, about as long as the head and body, covered with imbricated scales about as large as the abdominals; on the median line below a series of elongate transverse scutes commencing caudad of a seeming line of fracture near the base. No femoral or preanal pores. Above vinous-grey, flecked and stained with dark grey; below dull purple. Length 106 mm., head 15, tail 52, fore limb 14, hind limb 18, width of head 11.

Locality.—Bellenden Ker; collected by Mr. A. Meston.

I do not conceive that the greater degree of development of the imperfect digits and the presence of subcaudal scutes, if normal, are valid objections to this lizard being referred to *Perochirus*.

A REVISION OF THE AUSTRALIAN SPECIES OF EUPLEA, WITH SYNONYMIC NOTES, AND DESCRIPTIONS OF NEW SPECIES.

By W. H. MISKIN, F.E.S.

The Australian species of this genus are more numerous than have been hitherto supposed, and with the view of collating and arranging them in some order the following observations are offered. Upon examining the structural characters of the various groups, I find them so conflicting that I have been quite unable to arrange our species according to the subdivision of the old genus proposed in the various articles by Messrs. Moore and Butler, and feel constrained to retain them all under the one genus.

The following table will in some degree explain my meaning:-

A. Outer margin of primaries rather convex.	
a. Hinder margin of primaries in 3 consider-	
ably convex niveata.	
aa. With colourless oval patch on upperside	
of costa of secondaries in J Tulliolus.	
aaa. Sexual brands or scent glands none ? Darchia.	
bb. Without costal patch.	
bbb. Brands none	
cc. With costal patch Hippias.	
ccc. Brand single, oval shape; present on	
underside in J ? viridis.	
B. Outer margin more or less convex.	
b. Hinder margin moderately convex.	
dd. Costal patch none sulvester.	

1038 A REVISION OF THE AUSTRALIAN SPECIES OF EUPLO	ŒA,
ddd. Brands two, also present on underside Dan	rdanus
dddd. No corresponding brand marks on underside in Q Crit	thon.
C. Outer margin slightly excavated.	
c. Hinder margin moderately convex.	
ee. Costal patch none.	
eee. Brands none Bor	eas.
eeee. Single white band on underside	
corresponding to brand mark	
in other species; in both sexes ?mon	ilifera.
d. Hinder margin extremely convex.	
ff. Costal patch none.	
fff. Brand single, very large; underside brand double in 3.	
ffff. Single white band on underside	
corresponding to brand mark,	
in Q Am	ycus.
D. Outer margin decidedly excavated.	
e. Hinder margin excessively convex.	
gg. Costal patch none Corre	inna.
ggg. Brand single, small Euc	lus.
gggg. Single white line on underside	
corresponding with brand	

Genus Euplea, Fab.

A. Outer margin of primaries rather convex; hinder margin in & considerably convex; with colourless oval patch upper side of costa of secondaries in &; without sexual brands—or scent glands.

E. NIVEATA, Butler.

(Calliplea N.) Trans. Ent. Soc. p. 2, 1875; Jour. Linn. Soc. Zool. XIV. p. 296, 1878.

Moore, (Call. N.), Proc. Zool. Soc. p. 295, 1883.

Cape York.

Butler says this is distinct from his *Hyems = Aerisbe*, Feld., a Timor species, although his figure of the latter seems to exactly represent the C. York species, and the description would equally suit.

E. TULLIOLUS, Fab.

(Pap. T.) Ent. Syst. III. 1, p. 41, n. 103, 1793; Godart (Dan. T.), Enc. Méth. IX. p. 181, 1819; Don. Nat. Rep. II. t. 55, f. 1, 1824; Macleay, King's Aust. II. p. 461, 1827; Doubl. and Hew., Gen. D. Lep. p. 88, n. 26, 1847; Butler, Proc. Zool. Soc. p. 290, n. 64, 1866; (Call. T.) Jour. Linn. Soc. Zool. XIV. p. 296, 1878; Semper, Mus. Godff. XIV. Lep. p. 142, 1878; Moore (Call. T.) Proc. Zool. Soc. p. 295, 1883; var a. E. Saundersii, Feld. Reise Nov. Lep. II. p. 322, n. 439, 1867.

Rockhampton, northwards to Cape York; also from Fiji.

E. DARCHIA, Macleay.

(Dan. D.) King's Australia II., p. 462, n. 149, 1827; Butler, Jour. Linn. Soc. Zool. XIV. p. 296, 1878; Moore (Call. D.), Proc. Zool. Soc. p. 295, 1883; E. Priapus, Butler, Proc. Zool. Soc. p. 291, n. 67, t. 29, f. 2, 1866; Trans. Ent. Soc. p. 2, 1875; (Call. P.) Jour. Linn. Soc. Zool. XIV. p. 296, 1878; Moore (Call. P.), Proc. Zool. Soc. p. 295, 1883.

Port Essington.

I only know this species by description, but it must belong to this group.

Without costal patch, and without sexual brands.

E. MISENUS, n.sp.

3. Upperside.—Primaries: Dense velvety opaque brownish-black, without markings of any kind. Secondaries: Dark brown

with a silky gloss, except anal region, which is light brown, increasing in darkness towards base and discal area; from anal angle towards apex a sub-marginal row of faintly discernible small pale spots.

Underside.—Light shining brown, darker in discal area. *Primaries* with a bluish speck within and near end of cell, and another just outside. *Secondaries*, a small bluish spot within and at end of cell, and a series of five white small spots transversely beyond cell; a few outer sub-marginal white points from anal angle.

Thorax and abdomen, above black; beneath, dark brown.

Exp. $3\frac{5}{12}$ in.

Hab.—Cape York. Coll. Miskin.

This is probably the insect that Semper (Mus. Godff. p. 6) refers to, *Climena*, Cr., which it certainly very much resembles, but is, I think, sufficiently distinct.

With costal patch on secondaries of ξ ; and a single brand, oval-shaped, also present on underside in ξ .

E. HIPPIAS, n.sp.

3. Upperside.—Primaries: Rusty brown; centre of wing from just beyond base, where it commences narrowly, increasing in width outwardly, embracing lower part of cell and below last median branch, and extending outwardly to a short distance from middle of outer border, is a patch of very pale brown, growing lighter in shade, until at the extremity it is a yellowish-white. Secondaries, rust-brown, with a large oval-shaped patch of ochreous-brown occupying about one-half the cell and extending upwards towards costa.

Underside.—Primaries as above; secondaries all smokebrown, without markings of any kind.

Thorax and abdomen, above dark brown; beneath light brown.

Exp. $3\frac{3}{12}$ in.

Hab.—Cape York. Coll. Miskin.

E. VIRIDIS, Butler.

(Salpinx V.) Ann. Nat. Hist. (5) X, p. 38, Q, 1882; Moore (Saphara V.), Proc. Zool. Soc. p. 298, 1883.

Thursday Island.

I have not seen a specimen of this insect; it will probably come under this group.

B. Outer margin more or less convex; hinder margin moderately convex; costal patch none; brands two, also present on underside; no corresponding brand marks on underside of Q.

E. SYLVESTER, Fab.

(Pap. S.) Ent. Syst. III. 1, p. 41, n. 104, 1793; Don. Nat. Rep. IV. t. 129, 1826; Doubl. and Hew., Gen. D. L. p. 88, n. 25, 1847; Butler, Proc. Zool. Soc. p. 290, 1866; Westw., Trans. Ent. Soc. p. 108, 1872; Semper, Mus. Godff. p. 6, n. 7, 1878; Stictop. S., Butler, Jour. Linn. Soc. Zool. XIV. p. 303, 1878; Doricha S., Moore, Proc. Zool. Soc. p. 318, 1883; Dan. Sylvestris, Godart, Enc. Méth. IX. p. 182, n. 20, 1819; E. Pelor, Doubl. and Hew., Gen. D. L. t. 11, f. 1, 1847; Butler, Proc. Zool. Soc. p. 300, n. 91, 1866; Chenu, Enc. D'Hist. Nat. p. 64, f. 153, 1869; Stic. P., Butler, Jour. Linn. Soc. Zool. XIV. p. 303, 1878; Dor. P., Moore, Proc. Zool. Soc. p. 318, 1883; E. Melpomene, Butler, Proc. Zool. Soc., p. 300, n. 92, p. 298, f. 2, 1866.

Bowen to Cape York.

E. DARDANUS, n.sp.

3. UPPERSIDE. — Primaries: Velvety dense brownish-black, with slight purple reflection: a series of three bluish-white spots across and near to apex, the central much the largest, the lower a mere speck; two other round similar spots close to outer margin below the middle. Secondaries: Soft dark brown, much darker towards the base; a sub-marginal band of eight dirty white spots, of which the two central are double, the three towards apical angle round, the anal three elongate; all the spots are ill-defined on their inner margin, softening gradually into the brown.

Underside.—Light brown, the discal and basal areas much darker. *Primaries* with the spots as above, and in addition one small spot above and one below the apical series; four small blue spots in centre of wing, one being within and near to end of cell, and three transversely just beyond and below cell. *Secondaries* with the spots of sub-marginal band rather more defined; a discal group of blue specks, one within, five others encircling end of cell.

Thorax and abdomen black.

Exp. 3 in.

Hab.—Cape York. Coll. Miskin.

This species is near to *sylvester*, but is distinguished from it particularly by the absence of marginal rows of white specks in both wings.

E. crithon, n.sp.

3. UPPERSIDE.—Dense velvety black with purple reflection, without mark of any kind.

Underside.—Basal and discal areas dark brown, outer area light brown. *Primaries* with two blue-white small spots between 1st and 2nd, and 2nd and 3rd median branches, near end of cell. *Secondaries* with five small violet spots arranged in a semicircle around end of cell.

Thorax and abdomen black.

Exp. 3 in.

Hab.—Cape York. Coll. Miskin.

C. Outer margin slightly excavated; hinder margin moderately convex; costal patch none; brands none; single white band on underside corresponding to brand mark in other species; in both sexes.

E. BOREAS, n.sp.

3. UPPERSIDE.—Primaries: Dense opaque brown, with an arched apical band of five white spots; an outer complete marginal row of white specks; two small white spots within marginal row, just below middle. Secondaries: Dark brown with silken gloss; perfect outer marginal row of small white spots not quite reaching anal angle; a transverse band of white patches from anal angle, where they are largest, to apical angle, the two last being round and smaller, the others double and elongate; abdominal margin rusty brown.

Underside.—Light shining brown; discal area darker; with spots as above, but rather more developed, and with some additional ones in primaries; one in and near end of cell, and six others arranged transversely around end of cell, these having a bluish tinge. Secondaries also as above, with a curved series of five small bluish-white specks encircling end of cell, and one within.

Q. Similar to 3, but lighter brown and without gloss; the white markings somewhat more developed, and with an additional white spot situated upon the costa rather beyond middle, above and beneath, and three additional ones in the discal series.

Thorax and abdomen dark brown.

Exp. $2\frac{11}{12}$ to $3\frac{2}{12}$ in.

Hab.—Cardwell. Coll. Miskin.

E. MONILIFERA, Moore.

(Gamatoba M.) Proc. Zool. Soc. p. 262, 1883.

Thursday Island.

I only know this species by the description; it appears to come under this group.

Hinder margin excessively convex; costal patch none; brand single, very large; underside, brand double in β ; single white band on underside of Q corresponding to brand mark.

E. AMYCUS, n.sp.

3. UPPERSIDE.—Primaries: Dark velvety brown, outer area lighter; apical band of four irregularly-shaped clouded white spots, the two upper being the smallest; a small round white spot between 1st and 2nd median branches near outer margin. Secondaries: Base and discal area dark brown, rest of wing light brown; two small white sub-marginal spots near apex, lower one almost obsolete.

Underside.—Smoky brown, marked with bluish-white small spots, except apical ones, which are white. *Primaries*, an apical band of five spots; one within and near end of cell; three transversely below and beyond end of cell; hind margin very pale. *Secondaries*, three outer sub-marginal double spots near apex; one within end of cell; six in a semicircle around end of cell; costa with a rufous tinge.

Q as in Z, but somewhat paler, and with the spots rather less distinct.

Thorax and abdomen dark brown.

Exp. $2\frac{10}{12}$ - $3\frac{2}{12}$ in.

Hab.—Cape York. Coll. Miskin.

D. Outer margin decidedly excavated; hinder margin excessively convex; costal patch none; brand single, small; single white line on underside both sexes, corresponding with brand mark.

E. CORINNA, Macleay.

(Dan. C.) King's Aust. II. p. 462, n. 150, 1827; Butler, Jour. Linn. Soc. Zool. XIV. p. 299, 1878; Moore (Charapa C.), Proc. Zool. Soc. p. 270, 1883; E. Angasii, Felder, Reise Nov. Lep. II. p. 343, n. 476, 1867; Herr.-Schf., Stett. Ent. Zeit. p. 69, t. 2, f. 7, 1869; Ex. Schmett. II. f. 108, 3, 1869; Semper, Mus. Godff.

XIV, p. 141, 1879; Moore (Chanapa A.), Proc. Zool. Soc. p. 270, 1883; E. Lewinii, Felder, Reise Nov. Lep. II. p. 345, n. 478, 1867; Moore (Ch. L.), Proc. Zool. Soc. p. 270, 1883.

Brisbane to Cape York.

This species is exceedingly common in southern Queensland, but seems to get scarcer as we proceed north, where its place is taken by *Tulliolus* at Rockhampton, a very abundant species there; and by *sylvester*, still further north, which is found in equal abundance in its more particular locality.

E. EUCLUS, n.sp.

3. UPPERSIDE.—Chocolate brown, with yellowish-white spots. Primaries, a small sub-costal spot above middle; a series of six spots in an arched row across apex, three being pretty close to costa and very small, the two next large, the last small and near outer border; two spots near to and about middle of outer margin, the upper being the larger and further from border. Secondaries with a transverse band parallel to, but some little distance in from, outer margin, of elongate narrow spots in pairs between the nervules, except the upper three, which are round.

Underside.—Light shining brown, discal areas purplish-brown, spots in discal areas being bluish-white, other markings yellowish-white. *Primaries* with markings as above, and in addition a diseal spot and a transverse row outside of this of six small spots; a few sub-marginal specks. *Secondaries*: a transverse band as above; a discal speck, and a curved series around end of cell of seven small spots; a complete sub-marginal row of white specks.

Q. As in 3, but a shade lighter; a third spot upperside of primaries near hinder angle; the band in secondaries less developed.

Underside as in 3, showing the sub-marginal row of white specks in primaries more developed, and three spots instead of two towards hinder angle, the upper one being very large and round.

1046 A REVISION OF THE AUSTRALIAN SPECIES OF EUPLŒA.

Thorax and abdomen dark brown.

Exp. $3 \text{ in., } 9 3\frac{2}{12} \text{ in.}$

Hab.—Cape York. Coll. Miskin.

This species is very close to *Corinna*, but is pretty well distinguished on the upperside by the absence of sub-marginal row of white spots in both wings, and by the less developed transverse band of secondaries. On the underside the resemblance is somewhat close, but, as the latter is very stable in its appearance, I think this species must be considered as distinct.

E. BOISDUVALII, Lucas.

Rev. Zool. p. 321, 1853; Butler, Proc. Zool. Soc. p. 302, n. 90, 1866; Moore (Deragena B.), Proc. Zool. Soc. p. 272, 1883.

Australia.

I cannot identify this species with any form known to me. I assume it to belong to this group from the description.

E. EICHORNI, Staudinger.

Ex. Schmett. p. 53, T. XXVI. 1885?

N. Queensland.

I am unable to refer to description and figure of this species. I cannot therefore place it in any of my groups.

The following species are mentioned as Australian, I think erroneously:—

E. eleutho, Quoy; E. eschscholtzii, Felder; E. climena, Cramer; E. eleusina, Cramer.

ON CEDAR GUM (CEDRELA AUSTRALIS, F.v.M.).

By J. H. MAIDEN, F.L.S., F.C.S.

The well-known "Cedar" or "Red Cedar" of New South Wales and Queensland is the produce of a Cedrela, but in regard to the species there is a difference of opinion. Bentham (B.Fl. I. 387) considers it to be identical with C. Toona, Roxb., the Indian Toon Tree, which produces "Moulmein Cedar" and one of the "Chittagong woods." Baron von Mueller, on the other hand, created a new species for it (C. australis, F.v.M.). It is very certain the affinities of the two trees are very close, and it becomes interesting to see if examination of any of their products tends to throw any light on the subject.

The writer is not aware that the finding of gum on the New South Wales Cedar has hitherto been recorded, but a collector sent to the Technological Museum a small quantity recently. An old cedar-getter says that trees well exposed to the sun (? in unsuitable situations) yield most gum.

It is a very pale yellow gum, almost colourless, and in thin tears about an inch long. Between the teeth it almost feels leathery. It swells up largely in cold water, but in the course of twenty-four hours it nearly wholly dissolves, forming a solution colourless and faintly cloudy, like good gum arabic, and leaving a small percentage of metarabin.

It is one of the gums which form a connecting link between the Arabin group,—those gums which dissolve almost immediately in water, and the Metarabin group,—those which merely swell up in that liquid. It forms a fair mucilage, and on account of its freedom from colour it would be a valuable commodity if obtainable in any quantity. An analysis gave the following result:—

67

Arabin	• • •	•••	 68.3
Metarabin	,	•••	 6.3
Hygroscopic moisture			 19.54
Ash			5:16

Here we have a true gum, without so much as a trace of resin.

Following is the evidence the author has been able to collect in regard to the exudation of the Indian tree.

"It yields a resinous gum" (Cat. Kew Museums). Perhaps the experiments of von Essenbeck (infra) are the foundation for this statement.

"It is called bastard cedar from an aromatic (sic) resin exuding from it, resembling that of the American Cedar" (Art. Cedrela Toona in Surgeon-General Balfour's Cyclop. of India). No definite authority is given for this statement, and the writer is probably labouring under a misapprehension, as the name Cedar was bestowed in reference to the wood, and not to any exudation.

The experiments of Nees von Essenbeck, who extracted from the bark a resinous astringent matter, and a brown astringent gum, do not affect the point at issue one way or the other.

"Toon-ke-gond" (C. Toona) is enumerated by Dr. Wight as one of the gums of Coimbatore. Yet Cooke (Gums and Resins of India) who quotes this statement, says, "From the character of the timber one might suppose it rather a resin than a gum." I am not impressed with the force of the latter observation.

A sample of "Toon-ke-gond," the exudation of *C. Toona*, was exhibited by Dr. Royle at the Exhibition of 1851 (No. 52, p. 180, Jury Reports). It is not definitely stated whether it is a gum or a resin, and there is nothing in the context to clear up the point absolutely.

Dragendorff (Pflanzenanalyze, Greenish's Trans. p. 212) speaks of "the partially soluble gum of species of . . . Cedrela." To

this specific statement of a man who only employs the term "gum" in its proper significance, I attach much importance.

I consider the balance of probability to be largely in favour of the exudation in the Indian species being a gum and not a resin. As collateral evidence, the exudations from the Indian Melia Azadirachta, Linn., (another of the "Chittagong woods"), and the Australian form of M. Azedarach, Linn., may be instanced together with the Spotted or Leopard-tree gum (Flindersia maculosa). These are the only other exudations of the Meliaceæ recorded as far as I know. I have seen and examined them, and they are true gums.

ON THE NIDIFICATION OF HETEROMYIAS CINEREI-FRONS, RAMSAY, AND ORTHONYX SPALDINGI, RAMSAY.

By A. J. NORTH, F.L.S.

The Trustees of the Australian Museum have recently received from their collectors, Messrs. Cairn and Grant, specimens of the nests and eggs of *Heteromyias cinereifrons*, and *Orthonyx spaldingi*, from North-eastern Queensland, which with the sanction of the Curator I am here permitted to describe.

HETEROMYIAS CINEREIFRONS, Ramsay. Ashy-fronted Flycatcher.

" Win-dan," Aborigines of Cairns district.

During September and October of this year several nests of this species were obtained by Messrs. Cairn and Grant, in the scrubs of the Herberton tableland; in every instance they were found in the "Lawyer vines" (Calamus sp.), about four or five feet from the ground; several of these nests now before me have been built between the forked stems, or where several vines cross each other, in other instances they have been placed on the thin horizontal stems to which the nests are attached. The outside of the nest is formed of thin twigs bent into shape, wiry rootlets, skeletons of leaves, and the fibre of the "Lawyer vine;" the inside which is saucer-shaped, being neatly lined with finer materials, while the exterior portion of the nest is ornamented with mosses and lichens, which give it a pleasing appearance. Exterior diameter 4.5 inches, depth 4; internal diameter 2.75, depth 1.1. The eggs are two in number for a sitting and closely resemble in shape and colour large specimens of Artamus superciliosus, being of a dull buffy white ground colour, thickly covered, especially towards the larger end, with clouded markings of umber brown;

in some instances they are more clearly defined and boldly blotched, and have markings of deep bluish-grey appearing as if beneath the surface of the shell. A set taken on the 18th of September measures as follows:—Length (A.) 1.05×0.75 inch; (B.) 1.07×0.77 .

ORTHONYX SPALDINGI, Ramsay. Spalding's Orthonyx.

"Chowchilla," Aborigines of Cairns District.

This species, has recently been met with rather freely dispersed through the dense brushes of the coastal range, chiefly in the neighbourhood of the Mulgrave and Russell Rivers, in Northeastern Queensland. Mr. Cairn who found several nests of this species, states they are usually built in the tangled roots of "Lawyer vines," but not unfrequently on the top of a stag-horn fern, as high as twelve feet from the ground. The nest is a large bulky dome-shaped structure with an entrance on one side; it is composed of twigs, roots, and mosses, chiefly species of Hypnum, so loosely put together that it will not bear removal. Unlike its southern ally O. spinicaudus, it appears that only one egg is laid for a sitting. A nest found on the table land near Boar Pocket, on the 20th of June last, contained but one egg in an advanced state of incubation; others were found as late as the middle of August. The breeding season this year would appear to be from May till the end of September, young birds being procured in June, but as in other parts of Australia the breeding season of birds is greatly influenced by the rains.

The eggs which are pure white, vary from elongated to swollen ovals, some being equal in size at each end. Two average-sized specimens measure (A.) 1.45 inch $\times 1$, (B.) 1.38×1.1 .

NOTES AND EXHIBITS.

Professor Stephens exhibited, for Mr. M'Cooey, an Albino variety of *Dacelo gigas*, and read a lengthy note on the habits of the bird. Also, for the same gentleman, the head of a specimen of *Diemenia superciliosa* with two poison fangs in the right jaw.

Dr. Ramsay exhibited a specimen of *Dendrolagus Lumholtzi* from Mt. Bartle Frere, Northern Queensland. Also a rare Bird of Paradise (*Diphyllodes Gulielmi* III. 3), from New Guinea. Also specimens of a bower bird (*Prionodura Newtoniana*), 3, 9, and young 3; and *Sericornis gutturalis*, 3, 9, and young 3, from Mt. Bartle Frere, recently obtained by Messrs. Cairn and Grant, collectors for the Trustees of the Australian Museum.

Mr. North exhibited the nests and eggs described in his paper.

Mr. Skuse exhibited several specimens of the adults and pupacases of a species of Tachina, a Dipterous parasite of the larvæ of the common case-moth, Oiketicus elongatus, Saund. About seventy flies were reared from a single host. Also, specimens of Icerya purchasi, Mask., or the Cottony-cushion Scale, which he had recently found in large numbers infesting the Desert Cypress, or hill-pine [Frenela Endlicheri (?)], on the Mallabo range, near Wagga Wagga, N.S.W., which seems to strongly support the belief that this insect is indigenous in Australia. Also, several galls of Cecidomyidæ, from some of which Mr. Froggatt and himself had bred the perfect insects.

Mr. A. Sidney Olliff called attention to the phenomenal abundance of a large Noctuid Moth—apparently Agrotis spina, Gu., (A. vastator, Sc.)—during the early part of the present month in various parts of the country, especially in the vicinity of Sydney, where it appeared in such vast numbers as to cause great consternation amongst

those who are not aware that its food in the larval state is confined to low-growing herbage, and that at no stage of its existence does it eat cloth, furs, or feathers. A similar visitation of these moths occurred in October, 1867, which is recorded by Mr. A. W. Scott in an interesting paper in the Transactions of the Entomological Society of New South Wales (Vol. II. pp. 40-48), and by the Rev. W. B. Clarke in a letter in the "Sydney Morning Herald" of the 11th October, 1867. From these sources it may be gathered that the recent plague was identical in its details with that of 1867, inasmuch as the present visitation appears to be confined to the country on the sea-board side of the coast-range, and to be the result of the vast hordes of caterpillars, reports of whose appearances in various places have reached us from time to time during August and September. Mr. Olliff said that Agrotis spina was found in great numbers on the summit of Mount Kosciusko and other high points in the Australian Alps, and added that he was of opinion, after extended inquiry, that this species and no other was the true Bugong Moth, which formerly formed an important article of food amongst the blacks of the Upper Tumut district; the reasons for this opinion he hoped to place before the Society upon some future occasion.

Mr. Kershaw related his experiences of similar swarms of the same moth in Gippsland and at Western Port, Victoria.

Mr. Froggatt exhibited eight different kinds of galls, obtained chiefly in the neighbourhood of Rose Bay and Woollahra, together with the insects bred from them, and made the following remarks:

—"No. 1 is a very common gall on the stems of Acacia discolor, but is usually so infested with parasitic Hymenoptera (Fam. Chalcididæ) that out of some fifty galls the true makers (Fam. Cynipidæ) were obtained in only four instances; No. 2 is a very small gall occurring in numbers on both sides of the leaves of Eucalyptus corymbosa in the form of small rust-red excrescences, each of which contains from two to four gall-makers (Fam. Cynipidæ), but as many parasites (Fam. Chalcididæ)

are obtainable from them; No. 3 is a gall occurring generally on the midrib of the leaves of E. corymbosa, out of which only beautiful little wasps with black markings (Fam. Proctotrupidae) were obtained; No. 4 is a curious gall occurring also on E. corymbosa, from which a small Cecidomyia-probably the true gall-maker-together with parasites (Fam. Chalcididæ) were bred; No. 5 is an irregularly shaped gall occurring generally at the base of the leaves of E. corymbosa, from which only parasitic Hymenoptera (Fam. Chalcididæ) were obtained; No. 6 is a gall forming swellings on the twigs of E. corymbosa, from which only parasitic Hymenoptera (Fam. Chalci didæ) were obtained; No. 7 is the horned coccus gall (Brachyscelis munita, Sch.) from the horns of which parasites (Fam. Chalcididæ) emerged; No. 8 are oval coccus galls (Brachyscelis pileata, Sch.) from Port Hacking, from which Hymenoptera (Fam. Proctotrupidæ and Chalcididæ) together with two moths emerged."

Mr. Maiden exhibited a quantity of the gum of the Red Cedar described in his paper. Also a large collection (about 880 species) of European plants, which he then presented to the Society.

A vote of thanks was accorded to Mr. Maiden for his valuable present.

Mr. Fletcher exhibited a collection of sixty species of plants from the neighbourhood of Hay, N.S.W., a fairly representative sample of the luxuriant vegetation of the Murrumbidgee plains in the present almost unprecedentedly favourable season, during which the plains have been a magnificent natural flower-garden on a gigantic scale, whereas in the same month (September) of the preceding dry year they were entirely bare. Dr. Woolls, who has kindly examined the collection, states that he was struck with the unusual proportions of some of the plants, both leaves and flowers being larger than those of the typical plants described in the *Flora Australiensis*.

Mr. Fletcher also exhibited a small collection of plants sent by Captain Hoben, of North Peak Station, Nymagee, gathered on the station, which is situated between Nymagee and Mt. Hope, N.S.W. Also for Mr. Bolton, of Wagga Wagga, (1) specimens of an undetermined plant* which has made its appearance in one particular locality in the district, and respecting which, especially as regards its suitability or otherwise as a forage plant, information was sought; and (2) specimens of trefoil, and of a supposed hybrid (?) between this and clover.

^{*} Subsequently ascertained to be Silene cucubalus, Wibel, (S. inflata Sm.), given in Baron von Mueller's list of Victorian introduced plants, but not previously recorded from N.S.W. The other two plants exhibited were Medicago denticulata, Willd., and Trifolium glomeratum, Willd., both introduced.

WEDNESDAY, 27TH NOVEMBER, 1889.

The President, Professor Stephens, M.A., F.G.S., in the Chair.

Dr. Schewiakoff, Dr. Lauterbach, and Mr. Alexander Morton of Hobart were present as visitors.

DONATIONS.

- "Report of the Board of Governors of the Public Library, Museum, and Art Gallery of South Australia, with the Reports of the Standing Committees for 1888-9." From the General Director and Secretary.
- "Report of the Trustees of the Public Library, Museums, and National Gallery of Victoria for 1888, &c." From the Librarian.
- "Feuille des Jeunes Naturalistes." No. 228 (October, 1889). From the Editor.
- "The Victorian Naturalist." Vol. VI., No. 7 (November, 1889); "Ninth Annual Report, 1888-9, List of Members, &c." From the Field Naturalists' Club of Victoria.
- "Comité Géologique, St. Pétersbourg.—Mémoires." Tome III., No. 4; VIII., No. 1 (1888-9); "Bulletins." T. VII., Nos. 6-10; VIII., Nos. 1-5 (1888-9); "Supplément au T. VIII." From the Committee.

- "Bulletins de l'Académie Royale des Sciences, des Lettres, et des Beaux-Arts de Belgique." 3^{me} Série. Tomes XIV.-XVII. (1887-89); "Annuaire." 1888 and 1889. From the Academy.
- "Zoologischer Anzeiger." XII. Jahrg., Nos. 317 & 318 (1889). From the Editor.
- "Report of the Committee of Management of the Technological, Industrial, and Sanitary Museum of New South Wales, for 1888." From the Curator.
- "Bulletin of the American Geographical Society." Vol. XXI., No. 3 (1889). From the Society.
- "The American Naturalist." Vol. XXIII., No. 269 (May, 1889). From the Editors.
- "Proceedings of the United States National Museum." Vol. XI. (1888), Sheets 36-42, plates 41-60. From the Museum.
- "Abstract of Proceedings of the Royal Society of Tasmania, 15th October, 1889"; "President's Address, Nov. 18th, 1889." From the Society.
- "Research into the Pharmacology of some Queensland Plants, &c." By T. L. Bancroft, M.B. From the Author.
- "Reichenbachia.—Orchids Illustrated and Described by F. Sander, &c." Vol. II., Part 7 (1889). From Sir W. Macleay, F.L.S. &c.
- "Proceedings of the Zoological Society of London for the year 1889." Part II. From the Society.
- "Comptes Rendus des Séances de l'Académie des Sciences, Paris." Tome CIX., Nos. 8-11 (1889). From the Academy.

- "Victoria.—Second and Third Progress Reports of Royal Commission to inquire into and report upon the Sanitary Condition of Melbourne." From the Commission.
- "Journal of the Royal Microscopical Society, London, 1889." Part 4. From the Society.
- "Bulletin de la Société Belge de Microscopie." XV. Année, Nos. VIII.-x. (1889). From the Society.
- "The Australasian Journal of Pharmacy." Vol. IV., No. 47 (Nov., 1889). From the Editor.
- "Prodromus of the Zoology of Victoria." Decade XIX. By Frederick McCoy, C.M.G., M.A., &c. From the Premier of Victoria, through the Librarian, Public Library, Melbourne.

NOTE ON THE BREEDING OF THE GLOSSY IBIS, FALCIN-ELLUS IGNEUS (IBIS FALCINELLUS, LINN.).

By K. H. BENNETT, F.L.S.

As I have never heard of an instance of this bird breeding here before, nor seen a description of its nest or eggs, perhaps a short account may be of interest to my ornithological fellow members.

I will premise my remarks by stating that the present year in this part of the country (Lower Lachlan) has been an unprecedently wet one, surpassing in this respect the far-famed 1870. In consequence of this unusual rainfall large bodies of water have collected, exceeding anything previously seen by white men; and this doubtless has been the cause of the present bird, as well as several other aquatic species, breeding here this year that I had not known to do so previously; whilst birds that I had never seen here before, —though they did not breed—were amongst the visitants.

Some years ago I described in the Proceedings of the Society the breeding place of *Platalea flavipes*, Gould, and *Ardea pacifica*, Lath., which is situated in a large depression on the plain, and, for the greater part of its extent thickly overgrown with "Box" (Eucalyptus) trees, a few miles from Yandembah Station. In consequence of the great rainfall of the past few months, this hollow is now full of water reaching up to the lower branches of many of the trees, in fact quite a lake.

Wishing to obtain some spoonbill and herons' eggs I visited this place on the 22nd of October, and swam into the part of the hollow where the heronry is situated. Whilst swimming about I noticed a glossy ibis fly off a nest on the branch of a tree some eight or ten feet above the water, but having no idea that this bird bred here, I did not take much notice of the circumstance thinking that

the bird was merely perched there; but I remarked that the nest appeared recently constructed, and differed entirely from the scores of nests of many species of birds surrounding me. After obtaining a number of spoonbills' and other eggs I was returning to land, and in doing so again passed the same tree, and the ibis again flew off the nest. This aroused my interest, and I at once swam to and ascended the tree, and found that the nest contained one egg of a beautiful greenish-blue colour, somewhat resembling that of Ardea novæ-hollandiæ, but much brighter; this egg I took but unfortunately broke it whilst returning to land. The nest was placed in an upright three-pronged fork of a small tree, and was entirely composed of branches of box (Eucalyptus) leaves, built up to about a foot in height, slightly hollowed on the top, and without any lining beyond the leaves of which it was composed.

Thinking it probable that I might find other nests of this bird in this large and secluded swamp or lake, I again visited it on the 2nd of the present month (November), and when swimming up to the tree from which I had taken the egg on my previous visit, I saw the ibis to my surprise and gratification again fly off the nest, which on examination contained three beautiful eggs. A further search amongst the thickly growing trees resulted in the discovery of another nest which also contained three eggs, but these were so very much larger than the previous ones that had I not seen the bird on and fly off the nest, I should have considered them as belonging to some other species; but there is no possible doubt as to their identity, for, owing to incubation having begun, the bird was very reluctant to leave the nest, and let me approach almost to arm's length before she did so. This nest was exactly similar to the preceding one in material and structure, and placed in a similar position.

PRELIMINARY NOTES ON THE PHARMACOLOGY OF SOME NEW POISONOUS PLANTS.

By Thos. L. Bancroft, M.B., Edin.

(Communicated by J. H. Maiden, F.L.S.)

LAURELIA NOVÆ-ZELANDIÆ, A. Cunn., N.O. Monimiaceæ.

In a bush at Waipu, province of Auckland, N.Z., June 1887, whilst in search of poisonous plants, I found the bark of the tree called by the Maoris "Pukatea" had a rather agreeable aromatic bitter taste, a little of which was gathered for experiment.

Whilst at Christchurch some months later opportunity presented itself of investigating the physiological action of this and several other plants.

An alcoholic extract was made, which when injected into frogs, "the introduced frog from Australia, *Litoria aurea*," caused rapid death. A few spasmodic jerks of the hind limbs were noticed before the animal became flaccid. The muscles, motor nerves, and heart were apparently uninfluenced. A solution of the extract in water gave the reactions of an alkaloid.

Mr. Cheeseman of the Auckland Museum kindly told me the scientific name of the plant. There is only one other known species of *Laurelia* and that is indigenous to Chili.

Laurelia is related closely to the genera Atherosperma and Daphnandra, all the species of which genera possess active properties.

Myoporum Lætum, Forst., N.O., Myoporineæ.

Preparations of this plant are poisonous to frogs. The bark contains an oil and a wax; whether or not any other substance I did not decide. The oil, at any rate, is poisonous to frogs.

MELICYTUS RAMIFLORUS, Forst., N.O. Violarieæ.

This is a small tree with a peculiar tasting bark. An extract of it is slightly poisonous to frogs, and causes in them a good deal of secretion of the skin.

VERONICA SALICIFOLIA, Forst. VERONICA SALICIFOLIA, FORST.

DYSOXYLUM SPECTABILE, Hook.

GENIOSTOMA LIGUSTRIFOLIUM, A. Cunn.

SORHORA TETRA PUTERA Aiton SOPHORA TETRAPTERA, Aiton.

MARLEA VITIENSIS, Benth., N.O. Cornaceæ.

In May, 1888, through the courtesy of Messrs. F. M. Bailey and Carl Madsen, I had an opportunity to examine the Queensland collection of woods prepared for the Melbourne Exhibition,

A dozen or more bitter barks, not previously known, were found, but only that of Marlea vitiensis proved to be poisonous.

Preparations of this plant apparently kill frogs by bringing the heart to a standstill in diastole. Motor nerves and muscles are unaffected if death takes place rapidly, but if delayed they are found in a state of paralysis. This paralysis is due, in part at any rate, to stasis of blood circulation, for the heart beats very feebly from an early period of the poisoning. Vomiting is a remarkable symptom.

Frogs when poisoned with this substance become less irritable to a stimulus of any kind. The active principle is an alkaloid, easy of preparation. It is insoluble in chloroform, ether, benzine and turpentine, slightly soluble in water and in aqueous alcohol.

So far I have not been successful in getting it or any of its salts in a crystalline form.

It appears not to be emetine, although it probably belongs to the group of poisons of which emetine is the type.

LUFFA ÆGYPTIACA, Mill., N.O. Cucurbitaceæ.

This plant is a native of Northern Queensland, and was pointed out to me by Mr. Bailey as possessing an extremely bitter fruit.

Upon tasting the fruit there is experienced an intensely bitter sensation, which in a few minutes disappears but leaves a distressing acridity in the throat, which is not at its worst until several hours afterwards.

An extract is very poisonous and contains two principles, a bitter substance and a saponin.

Papaver Horridum, DC., N.O. Papaveraceæ.

I have for some years past been anxious to ascertain whether the native poppy contained morphine, but it was not until last August that I was enabled, through the kindness of Mr. J. H. Simmonds, to obtain a supply of the plant.

All parts of the plant have a slightly bitter acrid taste. An extract is very poisonous to frogs, Hyla cærulea, Chiroleptes australis, and Linnodynastes salminii, but in none of these frogs are there any tetanic spasms developed. Hylas develop tetanus after poisoning with morphine. I endeavoured to prepare morphine from an extract of this plant according to the method prescribed by the British Pharmacopæia, but failed to get even a trace of that substance, or indeed of any other substance. Judging from this and from the physiological effect on frogs it would appear that the active principle is not morphine. It is, however, quite as poisonous as morphine.

I have to thank Mr. Chas. De Vis, M.A., for the scientific names of the frogs.

Solanum verbascifolium, Ait., N.O. Solanaceæ.

A large shrub, often twenty feet high, with a bitter bark. An extract of the bark is only slightly poisonous to frogs.

An alkaloid can be prepared in a pure state from this plant in the following manner. Pulverise the bark, exhaust by boiling aqueous alcohol, distil off the alcohol, dissolve the extract in water, filter, precipitate with carbonate of soda. It seems to be insoluble in ether and chloroform, but very soluble in alcohol. It is not mydriatic. In these particulars it agrees with Solanine.*

Stephania Hernandiæfolia, Walp., N.O. Menispermaceæ.

The root of this plant is bitter. An extract of it is extremely poisonous to frogs. These animals are affected by it in a most remarkable manner. After they have had the poison injected into a lymph-sac, they remain perfectly quiet until suddenly they are attacked with violent convulsions, which last one or two

68

^{*} Since the above was written I have discovered that Solanine has been found in the fruit of this plant. (Wittstein's Organic Constituents of Plants, translated by Baron von Mueller, pp. 204 and 257.)

minutes, after which they become flaccid and have spasmodic contractions of all the limbs every moment or so, the contractions getting weaker and weaker until they cease. The heart continues to beat regularly for many hours and stops in full diastole.

There is a great increase of secretion of the skin.

Frogs that have had less than a lethal dose become very irritable; there is a marked increase of reflex excitability. It is difficult, however, to make them jump; when one does so it lands upon its belly and this causes a spasm. There is a loss of co-ordination of muscular movement.

If the brain of a frog be destroyed previous to poisoning with this substance, some convulsions appear but they are not of so violent a kind as when the brain is intact.

The physiological action of this substance appears identical with that of picrotoxin, the active principle of *Cocculus*, a genus of the same order as *Stephania*.

As picrotoxin is an easy substance to separate I shall ascertain whether it is present in this plant, and add the result of the chemical investigation as this paper passes through the press.

Note.—I failed to obtain picrotoxin from this plant, but found that the active principle was a totally different substance. It appears to be an alkaloid, and may be separated in the following manner:—Bruise the rhizome in an iron mortar, macerate for several days in rectified spirit of wine, decant the tincture and allow it to evaporate. Treat the extract with water, filter, add some neutral lead acetate, digest ten minutes and set aside for several hours, filter, remove excess of lead with sulphuretted hydrogen and evaporate to a syrup, add a very little liquor potassæ, and shake out the active principle with anhydrous ether.

It is thus left as a colourless, non-crystalline substance, like bits of gum arabic. It has a peculiar smell and is bitter, neutral to litmus, slightly soluble in water but very soluble in alcohol, easily soluble in acidulated water, and the resulting salts are apparently non-crystalline; they set as varnishes.

It is exceedingly poisonous, and the symptoms produced are those of the crude extract.

ON QUEENSLAND AND OTHER AUSTRALIAN MACRO-LEPIDOPTERA, WITH LOCALITIES, AND DESCRIPTIONS OF NEW SPECIES.

BY THOMAS P. LUCAS, M.R.C.S.E., L.S.A., L.R.C.P.ED.

In the following paper the classification followed is that laid down in Mr. Meyrick's papers.

RHOPALOCERA.

HETERONYMPHA AFFINIS, n.sp.

39. 45-55 mm. Head black. Palpi brown, white underneath, grey at base. Antennæ cinnamon-brown, clavelli darker, tipped with cinnamon-brown. Thorax brown, posteriorly on dorsum rich black hairs, underneath light brown. Abdomen rich brown, with freely scattered black hairs, light brown underneath. Forewings narrowly triangular, costa bowed in middle third, apex rounded, hind margin oblique, slightly wavy, rich cinnamon-brown with a deep black bordering enclosing all the ground colour spots or cells. These cells are as follows, three costal, 1st in Q sub-lunar, from near costa at 1 outwardly to centre of wing-in the 3 this is divided transversely through centre by a narrow black line, and the outer half is attenuated as a narrow curved line to near base of wing; 2nd from \(\frac{2}{3} \) costa elongated diagonally for half the distance toward middle of hind margin; 3rd a rounded spot just before apex; at the inner angles of 2nd and 3rd blotches is a round mark, white in Q, yellow-brown in &; between this and hind margin is a small ground colour spot, and another immediately below it; from near base to 3/4 inner margin, but divided

by its own width from inner margin, is a broad rounded-off bar; and between this and dots on hind margin is a large oval blotch contracted in the centre; the basal portion of the wing and especially the costal portion is thickly covered with dark brown hairs: cilia brown and black. Hindwings, basal and inner portions dark, colour as forewings; a deep black dentated bordering from basal portion divides wing, to near apical angle of costa, into two series of brown spots or cellsthe anterior or costal portion is divided by black lines into two large cells and two supplementary cells; the hind portion is divided into four helmeted cells; the innermost is small and almost obscured by adpressed dark brown hairs; the 2nd contains an ocellus, consisting of a white centre dot, a deep black ring, a narrow brown ring and a narrow black ring from within outwards; the 3rd is divided by a broad black lunular band; the 4th is simple; there is a fine submarginal black line crossed by the black bar lines dividing the margin ground colour into 5 crenulated cells; the anal one linearly elongated round anal margin; cilia brown tinted with black. In 3 a linear ground colour line runs along costal side of inner margin band, and curves to join first costal blotch which is curved and contracts in centre at point of junction. Cells in hindwing in 3 smaller and more obscured by diffused black-brown.

This species differs from H. Banksii, Leach, in its larger size, deeper colour, greater profusion of black, and in having only 7 spots instead of 10 in forewing. There is no costal bar as in H. Banksii. The band of black in hindwing stretches uninterruptedly across, while in H. Banksii it is irregular and narrower. The ocellus in H. affinis consists of more rings than that of H. Banksii.

Gippsland, Victoria.

LYCÆNIDÆ.

LYCÆNA ATTENUATA, n.sp.

JQ. 14-17 mm. Head, thorax, and abdomen brownish-black-Palpi grey. Antennæ finely annulated, brown and white.

Forewings, costa rounded, apex rounded, hindmargin obliquely rounded, purple-blue freely dusted with grey-black scales; costal border and hindmarginal border suffused with grey-black, deeper at apex of wing, narrowed toward anal angle. Hindwings as forewings, with a well-defined narrow grey-black border round whole contour of wings semi-translucent, allowing some of the underside spots to be seen through; Q as 3, but larger and more suffused with purple-blue, grey-black border deeper and better defined. Undersurface grey-white; in forewings a circular row of seven black dots, three along and near costa, four from near apex of hindmargin to near centre of wing, a small discoidal spot in centre, in hindwings there is a circular line of black dots from base to 3/4 expansion of wing, three along costa, one near costa at 2, five diagonally toward inner border at 1, and two or three along inner border; a diffused discoidal spot in centre, and two or three spots nearer base in a line with second dot on costa; a narrow grey suffused line near hindmargin of all wings.

Mountains near coast in S.E. Queensland. Allied to Lycana exilis, Luc., and L. Lysimon, Hüb.

A most delicate insect, and perhaps the smallest of all the Australian butterflies.

SESIADÆ.

Sesia isozona, Meyr. Brisbane, Maryborough. Sesia chrysophanes, Meyr. Bowen.

ARCTIADÆ.

Exotrocha Liboria, Cr. Brisbane.

- 3. CALAMIDIA SALPINCTIS, Meyr. Brisbane; and
- Q. Calamidia Hirta, Meyr.—are doubtless, as Meyrick conjectured, one species. I obtained both sexes at Moe in Gippsland, Victoria, and at passion fruit flowers in Brisbane.

Scoliacma bicolor, Boisd. Brisbane, Drouin; Gippsland, Melbourne.

1068 ON QUEENSLAND AND OTHER AUSTRALIAN MACRO-LEPIDOPTERA,

Scoliacma orthotoma, Meyr. Brisbane; Frankstone, near Melbourne.

Scoliacma iridescens, n.sp.

 $\Im Q$. 20-22 mm. Head, palpi, antennæ and thorax cinnamonbrown. Abdomen grey mixed with cinnamon-brown. Forewings elongate, dilated, cinnamon-brown, irrorated with suffusions of purplish-brown, costa arched, hindmargin rounded; a suffusion of purplish-brown on costa from $\frac{1}{5}$ to $\frac{1}{2}$, narrowly so along apical angle, and broadly so on inner margin from $\frac{1}{5}$ to $\frac{2}{3}$ for one-third the width of the wing: cilia brownish-grey. Hindwings light ochreous brown, lightly clouded with scattered smokygrey; cilia ochreous-brown. Under surface of forewing in centre, and of hindwings overlapped by forewings, dark smoky-brown, almost black.

Brisbane, in deep scrub; rare. Allied to S. cervina, from which it differs in its iridescent colouring, and in the scant and lighter smoky colouring of under side of wings.

SCOLIACMA CERVINA, n.sp.

 $\Im Q$. 20-22 mm. Head, palpi, antennæ, thorax and abdomen fawn colour. Legs light brown. Forewings elongate, costa gently rounded, hindmargin very obliquely rounded, fawn colour: cilia fawn colour. Hindwings and cilia light ochreous-fuscous. Under surface of forewings to $\frac{1}{3}$, and costal half of hindwings to $\frac{3}{4}$ or nearly to notched apex smoky-black.

This is by far the darkest species of this genus yet described from Australia,

Brisbane; rare.

TIGRIODES SPLENDENS, n.sp.

40 mm. Head orange. Palpi and antennæ black. Thorax orange, patagia and dorsal tuft posteriorly blue-black. Abdomen ochreous-yellow. Legs yellow. Forewings elongate, costa slightly rounded, apex acute, hindmargin rounded, orange-yellow tinted with red; markings blue-black, costa for $\frac{1}{3}$ black;

in middle of costa a broad bar to half across wing, then expands toward base to $\frac{1}{3}$, forming a clavate figure towards inner margin; from $\frac{3}{4}$ costa to anal angle a line cuts off the triangle on apex of wing—which is blue-black, with an oblong ovate yellow spot at apex of wing: cilia black. Hindwings ochreous-yellow; cilia ochreous.

Mackay (Mr. Ronald Turner).

TIGRIODES TRANSCRIPTA, n.sp.

 $\Im Q$. 18-20 mm. Head, palpi, antennæ, thorax and abdomen light brown. Forewings narrow, elongate, costa gently arched, hindmargin rounded, light brown, with freely scattered fuscous scales; markings in many specimens indistinct, smoky-brown, 1st line from a dot in costa at $\frac{2}{5}$, angulated towards hindmargin and through two irregular dots to $\frac{2}{5}$ inner margin; 2nd line from dot in costa at $\frac{2}{3}$, irregularly and often denticulate, to $\frac{4}{5}$ of inner margin: cilia light brown. Hindwings and cilia light brown.

Brisbane; rare.

TIGRIODES NANA, Walk. Brisbane.

TIGRIODES SPILARCHA, Meyr. Brisbane; Melbourne.

TIGRIODES PULVERULENTA, n.sp.

3Q. 24 mm. Head, palpi, antennæ, thorax and abdomen light grey fawn. Forewings narrow elongate, costa gently rounded, hindmargin oblique, slightly rounded, ochreous-brown with numerous fawn coloured scales aggregated on basal half of inner half, and apical half of costal half of wing: cilia ochreous-brown. Hindwings brownish-ochreous; cilia ochreous.

Allied to T. spilarcha, from which it differs in smaller size, uniformity of colour and absence of markings.

Brisbane; rare.

1070 ON QUEENSLAND AND OTHER AUSTRALIAN MACRO-LEPIDOPTERA,

TEULISNA DASYPYGA, Feld. Daintree River.

Brunia Harpophora, Meyr. Brisbane, Cooktown.

BRUNIA REPLETA, n.sp.

3Q. 21-25 mm. Head, palpi, antennæ ochreous fuscous. Thorax and abdomen greyish-ochreous. Forewings elongate, dilate, costa gently arched, hindmargin obliquely rounded, ochreous-brown, tinged with cinnamon-ochreous from near base, gradually getting lighter ochreous toward hind margin: cilia brown ochreous. Hindwings and cilia light brown ochreous.

Brisbane; rare.

BRUNIA FRAGILIS, n.sp.

3Q. 14 mm. Head, palpi, antennæ, thorax and abdomen creamy-ochreous. Forewings elongate, somewhat dilated, costa gently arched, hindmargin obliquely rounded, pale straw or pale ochreous: cilia pale ochreous. Hindwings and cilia pale straw, lighter than forewings.

Brisbane; rare.

BRUNIA REPLANA, Lw. Brisbane,

Brunia intersecta, n.sp.

 \bigcirc 32 mm. Head, palpi and thorax creamy-ochreous. Antennæ grey. Abdomen in specimen wanting. Forewings elongate, dilate, costa arched, hindmargin rounded, creamy-ochreous; a purplish dark grey band from costal half of base of wing, filling centre third of wing, upper border from costa at $\frac{1}{10}$ to near costa at $\frac{2}{5}$ where it forms a prominent angle, thence abruptly to near middle of wing at $\frac{7}{8}$, thence reflected forming an angle to costa just before apex; under border from base in centre of wing to near inner border at $\frac{3}{4}$, then reflected as an angle to inner border, veins on this band black, a sub-marginal line of black angular

dots, bounded by a light ochreous fine line and by a deep black hindmarginal fine line: cilia purple-grey. Hindwings yellowochreous, hindmargin near apex, black with short fine transverse black lines; cilia yellow-ochreous, near apex purple-grey.

Queensland. In Museum collection, Brisbane; believed to be from North Queensland.

LITHOSIA CHIONORA, Meyr. Brisbane.

LITHOSIA UNICOLOR, n.sp.

3Q. 28 mm. Head, palpi ochreous-yellow. Antennæ light brown. Thorax ochreous-yellow. Abdomen ochreous-brown. Forewings elongate, moderately dilated, costa gently arched, hindmargin obliquely rounded, light ochreous-yellow: cilia ochreous-yellow. Hindwings and cilia as forewings, in some specimens a little lighter.

Brisbane.

SIMMETRODES NITENS, Walk.

 \mathfrak{F} . Described by Meyrick, P.L.S.N.S.W. He says he identified my three specimens from Walker's description only, and may be mistaken. Walker's descriptions are very meagre, and several species are superficially very similar in appearance. I obtained more specimens and I believe \mathfrak{Q} at Dunwich, Stradbrook Island. The \mathfrak{Q} is slightly larger, and is a light straw colour, some specimens shaded with brown.

Dunwich, near Brisbane.

HETERALLACTIS EUCHRYSA, Meyr. Brisbane.

Calligenia Pyraula, Meyr. Port Douglas.

CALLIGENIA CYCLOTA, Meyr. Port Douglas, Cairns.

Calligenia melitaula, Meyr. N. Queensland.

Calligenia structa, Walk. Dunwich, Brisbane (Rev. — Ash); N. S. Wales. HECTOBROCHA PENTACYMA, Meyr. N. Queensland.

HECTOBROCHA MULTILINEA, n.sp.

3Q. 25-32 mm. Head and anntenæ ochreous. Thorax ochreous, collar and base of patagia black. Abdomen ochreous, terminal segment in Q black at base. Legs ochreous, femora and tibiæ barred with smoky-black. Forewings oblong, broadly dilate, costa rounded, apex obtuse, hindmargin rounded, inner margin gently sinuous, ochreous; costa for 2 in 3, 1 in Q black, six sinuous freely dentate transverse black bars from costa to inner margin black; 1st near base of costa to base of inner margin, 2nd from 1/5 costa to 1/4 inner margin; 3rd in 3 close beyond and parallel, in Q from $\frac{2}{3}$ costa to just before $\frac{1}{2}$ inner margin, 4th and 5th close and parallel from near \(\frac{3}{4} \) costa to near 4 inner margin, 6th sub-marginal; there are discal and discoidal spots, one between the 2nd and 3rd bars, and one sometimes divided transversely into two between 3rd and 4th bars: cilia ochreous. Hindwings ochreous with a broad smoky-black hindmarginal fascia, extending from just below apex to 2 toward anal angle; discoidal spots faint or absent; cilia ochreous. Brown hairy larvæ on rocks; probably feed on lichens.

Brisbane.

HECTOBROCHA SUBNIGRA, n.sp.

Q. 32 mm. Head light fawn colour. Palpi black. Antennæ, thorax and abdomen, light smoky-fawn colour. Forewings elongate, dilate, costa arched, apex rounded, hindmargin rounded, smoky-fawn colour with markings of smoky-black; dot at base, one at inner margin close to base, a larger one in centre near base, and a narrow mark between this and costa black; fine line on costa to $\frac{1}{2}$ black; there are four rounded angular zig-zig lines, 1st from $\frac{1}{4}$ costa to $\frac{1}{4}$ inner margin; 2nd from just before $\frac{1}{2}$ costa to just before $\frac{1}{2}$ inner margin, these are united by four transverse lines, or touchings of their angles, and contain a black dot at $\frac{1}{3}$

from costa; at same distance from costa just before $\frac{2}{3}$ is a larger black dot; 3rd line from $\frac{2}{3}$ costa to $\frac{2}{3}$ inner margin; 4th line from $\frac{4}{5}$ costa to $\frac{4}{5}$ inner margin—these two lines with suffusion of smoky-black in the angles form a fascia, with the lighter ground-colour in middle and more towards inner margin; sub-marginal line very angulated or deeply toothed, lighter than other lines and forming dots round anal angle: cilia smoky-fawn colour. Hindwings and cilia same colour as forewings, with broad smoky suffused sub-marginal band, not touching margin, from costa to anal angle.

Brisbane; one specimen. November; dense scrub.

NEOBROCHA PHAEOCYRA, Meyr. N. Queensland.

TERMESSA GRATIOSA, Walk. Brisbane.

TERMESSA CONGRUA, Walk. Brisbane.

TERMESSA CONOGRAPHA, Meyr. Brisbane, Maryborough.

ZIA TACTALIS, Walk. Rockhampton.

THRYPTICODES XYLOGLYPTA [Meyr. MS.], n.sp.

 \Im Q. 24-26 mm. Head ochreous-grey. Palpi long, white-grey. Antennæ smoky-grey. Thorax and abdomen brownish-grey. Forewings elongate, triangular, costa rounded, apex obtuse, hind-margin rounded, brown or ashy-grey, irrorated with darker grey scales, and brown, chocolate and black often variable markings; a dark spot from costa near base nearly to inner margin, a brown rhomboid blotch from costa at $\frac{2}{3}$ for one third towards anal angle of hind margin, a thin sub-lunar line from costa immediately beyond, nearly along costa, minute brown spots along costa to near apex, a small suffused blotch of brown scarcely touching hind margin at $\frac{1}{4}$; a suffused brown border along whole inner margin; a black bar, more or less suffused, from hindmargin just before anal angle, one-third toward base and angle obliquely to inner

1074 ON QUEENSLAND AND OTHER AUSTRALIAN MACRO-LEPIDOPTERA,

margin at $\frac{3}{5}$: cilia brown and grey. Hindwings whitish-grey, darker suffusion near hindmargin; a cluster of brown-grey hairs just before $\frac{1}{2}$ costa; cilia whitish-grey.

Brisbane.

Mr. Meyrick kindly named this species for me.

SAROTRICHA UNDULANA, Hb.

I have taken fourteen specimens of a Sarotricha at Brisbane, which Mr. Meyrick considers to be S. undulana This is a British species, and naturally led to the idea that it must be a mistake. But my specimens are certainly not English. They were taken at light. I hope to obtain more and better marked specimens next season, and so enable Meyrick to confirm his opinion or, what I believe will rather be, to find this to be a new allied species. Of course it may be an introduced species. I do not know its food plant. But an English moth is hardly likely to establish itself so near the tropics and not in Tasmania, N. Zealand, Melbourne or Sydney.

SAROTRICHA DEMIOTA, [Meyr. MS.] n.sp.

line just beyond fainter, irregular and toothed; in some specimens a dark discal spot near centre of wing at $\frac{2}{3}$; in some suffusions of rust colour, brown near centre of wing and costa; in some only irregular pencillings at irregular distances, and for varied lengths transversely across wing: cilia grey. Hindwings whitegrey or brown-grey, with smoky suffusion towards apical half of hindmargin; cilia grey.

Brisbane.

If Meyrick's determination be right, a most variable moth.

SAROTRICHA PUNCTATA, n.sp.

3Q. 26 mm. Head, palpi creamy-grey. Antennæ grey. Thorax smoked-grey, two black dots in front, four immediately behind, and three posteriorly. Abdomen brownish-drab. Forewings with costa gently rounded, hindmargin rounded, creamvgrey suffused in patches with smoky-drab and brown, and covered with deep black dots; a dot at base in centre, one at ½ costa and from this a series of spots more or less united to 1/6 inner margin; a dot at \frac{1}{3} inner margin; an angular spot at \frac{2}{5} costa, further angled to a dot on middle of wing at 2-thence interrupted to a dot at ½ inner margin; a dot beyond ½ costa, and in a line of interrupted dots to $\frac{3}{5}$ inner margin; a conspicuous spot at $\frac{3}{4}$ costa, thence an irregular zigzag grey line 2 inner margin, a fine line at 5 costa, and a line often divided into two dots at apex of costa, thence as a zigzag interrupted line of dots to just before anal angle of inner margin, a sub-marginal row of fine dots on veins: cilia grey. Hindwings grey becoming browner toward hindmargin and there forming a suffusion of brown; cilia grey.

Brisbane; 4 specimens.

SOROCOSTIA MESOZONA, [Meyr. MS.] n.sp.

δQ. 15 mm. Head in some specimens snow white, in others grey. Palpi, antennæ grey. Thorax white. Abdomen grey.

Forewings elongate-triangular, costa gently arched, hindmargin rounded, white with scattered grey scales, and rich brown markings; a broad central fascia, not touching costa at middle, to middle of inner margin, with dots or short marks of black-brown, one or two or three brown dots, irregular, near base, a line of finely defined black dots just before central fascia, two or three faint dots near costa before apex, a sub-marginal line of dots: cilia grey. Hindwings white; cilia grey.

Brisbane; rare. Mr. Meyrick has kindly named this species for me.

Sorocostia aulacota, Meyr. Brisbane.

SOROCOSTIA ARGENTEA, n.sp.

\$\textit{\Q}\$. 11-14 mm. Head, palpi, antennæ, and thorax silvery white. Forewings elongate-triangular, costa rounded, hindmargin obliquely rounded, grey-white with freely scattered silvery scales, costal edge finely grey, tufts at \(\frac{2}{5}\) and \(\frac{3}{5}\), sub-costal black with raised silvered scales—two small black dots, one between the 1st tuft and inner margin, the other at \(\frac{1}{5}\) and a little distant from inner margin, surrounded by silvered scales; in some specimens the veins show grey, and there is a grey sinuous zigzag line from apex of costa to just before anal angle of inner margin, but in most specimens these are obscured by the silvery scales: cilia white. Hindwings and cilia greyish-white.

Brisbane; rare.

Sorocostia cycota, Meyr. Brisbane.

Sorocostia Leucoma, Meyr. Brisbane.

SOROCOSTIA INTERSPERSA, n.sp.

∂Q. 13-18 mm. Head dark grey, face white, palpi and antennæ
grey-white. Thorax grey, patagia darker grey. Abdomen grey,

base of segments smoky-grey. Forewings oblong, dilate, costa rounded, hindmargin oblique, scarcely rounded, white-grey, with markings of grey and lines of smoky-grey; 1st line from $\frac{1}{6}$ costa to $\frac{2}{3}$ toward inner margin, space within this line to the base more or less suffused with grey and bounded on inner margin with two smoky dots; 2nd line $\frac{1}{3}$ costa to $\frac{1}{2}$ inner margin, costal half dentate, inner half finer dotted; 3rd line from $\frac{2}{3}$ costa to $\frac{3}{4}$ inner margin, finely and frequently dentate, broader in centre, and containing with 2nd line a grey space and a smoky-grey angulated or lunar discal line; 4th line immediately beyond and parallel to 3rd line dentate, intervening space white-grey; beyond this line are three smoky-grey dots in costa, with an apical greyish suffusion; costa grey and smoky-grey. Hindwings white-grey with irregular suffusion of smoky-grey; cilia grey.

Brisbane.

Nola Lugens, Walk Brisbane, Cooktown; Melbourne.

Nola Metallopa, Meyr. Brisbane; Melbourne.

Mosoda Jucunda, Walk. Brisbane, Gayndah, Duaringa.

Mosoda Bancrofti, n.sp.

32. 18-21 mm. Head, palpi and antennæ black, collar reddishbrown. Thorax black. Abdomen orange-brown, terminal segment black above, orange-brown on under side. Legs black, middle tibiæ and posterior femora and tibiæ light orange-brown. Forewings elongate, costa arched, apex rounded, hindmargin obliquely rounded; purplish-black, with five rounded orange-brown spots; first on inner margin at \(\frac{1}{4}, 2nd \) on costa \(\frac{2}{5}, 3rd \) obliquely beyond this, on middle third of wing, touching 2nd and sometimes confluent, 4th touching anal angle of hindmargin, and 5th touching costa, just before apex: cilia black. Hindwings orange-brown with black border, deep at apical angle, but becoming attenuated to a mere line at anal angle of hindmargin; cilia black.

Brisbane; dense scrub; September, flying in sunshine. I have much pleasure in naming this species after Dr. T. L. Bancroft, who has given me much assistance in collecting.

Mosoda venusta, n.sp.

 $\Im Q$. 18 mm. Head reddish-ochreous. Palpi dark smoky-grey. Antennæ smoky-grey, lighter towards extremity. Legs ochreousbrown. Thorax black, dotted anteriorly with reddish-ochreous. Abdomen black, anal tuft ochreous. Forewings elongate-triangular, costa moderately arched, hindmargin obliquely rounded, reddish-ochreous with black bands edged with deeper red; short bar on base of costa joins a spot in centre of base of wing, and joins a short bar at base of inner margin; a deep band from $\frac{1}{2}$ costa to $\frac{2}{3}$ inner margin, once denticulate in centre on both borders; a second band from $\frac{1}{3}$ costa to anal angle of hindmargin, sometimes diffused to apex and contracted opposite middle of hindmargin. Hindwings ochreous-red, darker than forewings, with a broad hindmarginal black band, broadest at apex.

Brisbane.

Mosoda sejuncta, Feld. Brisbane; Melbourne.

Mosoda Lineata, n.sp.

 \Im Q. 14 mm. Head grey. Palpi brown. Antennæ smokygrey. Thorax white with a black V-shaped mark on dorsum. Abdomen greyish-white. Forewings triangular, costa gently rounded, hindmargin nearly straight, grey-white with black-brown markings; triangular dot on costa near base attenuated to base; a narrow bar angulated in middle from $\frac{1}{3}$ costa to just before $\frac{1}{2}$ inner margin; a bar at $\frac{2}{3}$ diffused to near apex of costa and narrowing to $\frac{3}{4}$ inner margin, sub-dentate; an interrupted band on hindmargin; costa black and grey. Hindwings and costa grey, darker grey toward margin, indistinct discal spot.

Brisbane; 5 specimens. Near to Mosoda servilis.

Mosoda servilis, Meyr. Toowoomba; Melbourne.

SCAEODORA RAVA, n.sp.

 $\Im \mathbb{Q}$ 12-15 mm .Head, palpi, antennæ, thorax, abdomen and legs fuscous-grey. Forewings elongate, dilate, costa rounded, apex and hindmargin rounded, brown-grey with a few scattered darker scales; costal line darker, with a dark triangular spot near apex; lines excepting sub-marginal faint smoky-grey; 1st from $\frac{1}{4}$ costa to $\frac{1}{4}$ inner margin; 2nd from $\frac{1}{3}$ costa to $\frac{1}{3}$ inner margin, in some specimens these two lines enclose a dark suffusion, a well defined discal spot at $\frac{2}{3}$, one-third from costa; 3rd line from $\frac{3}{5}$ costa, convex to hindmargin to $\frac{1}{2}$ inner margin; 4th line or sub-marginal line, a series of dark brown dots on the veins; marginal line fine: cilia light grey and brown. Hindwings light whitish-brown, marginal line darker brown.

Brisbane.

This is a larger species than S. omophanes, Meyr., which I discovered at Frankstone, Victoria. It may have to be made into a new genus, but provisionally I have retained it here.

CHIRIPHE MONOGRAMMARIA, Walk. Brisbane, Toowoomba.

CHIRIPHE DICHOTOMA, Meyr. Brisbane.

CHIRIPHE DICTYOTA Meyr. Brisbane, Toowoomba.

CHIRIPHE ANGULISCRIPTA, n.sp.

3Q. 20 mm. Head white. Palpi and antennæ black. Thorax black in front, white behind, with white epaulettes, banded with black line at base. Abdomen smoky-grey, anal tuft creamy-ochreous. Forewings elongate, costa rounded, hind margin oblique, straight, white, markings black; costal spot near base, extended half way to inner margin; six irregular lines or

interrupted dots; an oblique spot on costa at $\frac{1}{5}$ from near which 1st line curves outward to $\frac{1}{4}$ inner margin; an irregular triangular spot on costa at $\frac{1}{2}$ from the centre of which 2nd line bends sharply toward base of wing and then abruptly turns to $\frac{1}{2}$ inner margin, where it is suffused into a large spot, and receives third line from a point short of costa at $\frac{3}{4}$; 3rd line waved; at $\frac{4}{5}$ costa is an oblong spot, from which proceeds 4th line to near anal angle of inner margin, and fifth line which joins 6th or hindmarginal line near anal angle: cilia white, with darker spots. Hindwings smoky-grey; cilia grey.

Brisbane; September, October; on fences. Allied to C. dictyota.

THALLARCHA PHALAROTA, Meyr. (T. PHAEDROPA, Meyr.).

The latter is but the Q of the former, consequently the name phaedropa must drop; several pairs taken in cop.

Brisbane; November: Myrtleford and Melbourne, Victoria.

THALLARCHA AURANTIACEA, n.sp.

3. 16 mm. Head black, face orange. Palpi orange. Antennæ black. Thorax and abdomen black. Forelegs black; femora and tibiæ of middle legs ochreous-yellow; posterior legs ochreous-yellow. Forewings elongate, costa rounded, hindmargin obliquely rounded, black, iridescent with purple; second fourth of wing transversely orange; cilia black. Hindwings orange, with a rich black border round inner and hindmargin, and broadened at apex of costa; cilia black.

Brisbane; September; dense scrub.

COMARCHIS EQUIDISTANS, n.sp.

♂. 25 mm. Head ochreous. Palpi black. Antennæ grey. Thorax black, anterior edge finely ochreous and an oval oblong spot posteriorly on dorsum ochreous, patagia entirely black. Abdomen ochreous, dorsum of middle segments and dorsum and sides of posterior segments black, anal segment ochreous. Forewings elongate, costa gently rounded, hindmargin obliquely rounded, ochreous with red toward inner margin: 5 black equidistant transverse bars, 1st near base and 5th just before hindmargin, 2nd, 3rd and 4th equidistant between: cilia ochreous. Hindwings ochreous-red, with broad marginal smoky-grey fascia, divided from before centre to apex of hindmargin; sub-marginal division lighter; cilia smoky-ochreous.

Toowoomba (Mr. Boyd).

COMARCHIS GRADATA, n.sp.

3. 30 mm. Head and face ochreous, crown of head streaked with black. Palpi black. Antennæ grey. Thorax black, three ochreous dots anteriorly. Abdomen black, base of segments narrowly ochreous, anal tuft ochreous. Legs grey, under surface ochreous. Forewings elongate-triangular, costa nearly straight, apex acute, hindmargin rounded, ochreous, markings black; 1st narrow bar at base of wing; 2nd from 4 costa to 4 inner margin, narrowing on costa as costal line to basal bar; 3rd from ½ costa to $\frac{3}{4}$ inner margin, bars 2 and 3 united by bar in middle, forming roughly the letter H; 4th bar \(^3\) costa to just before anal angle of inner margin, a short bar crosses this at 1/3 from costal margin and projects half way to hindmargin, with short denticulation on opposite side, a 2nd cross-bar nearer inner margin reaches to hindmargin; hindmarginal line narrowly black: cilia black. Hindwings ochreous, with broad hindmarginal black fascia, narrowing toward anal angle; cilia black.

Toowoomba (Mr. Boyd).

Comarchis staurocola, Meyr. Brisbane.

Comarchis sparsana, Walk. Brisbane; Melbourne.

COMARCHIS IRREGULARIS, n.sp.

3Q. 20 mm. Head, face, and antennæ white. Palpi very short, black. Collar black. Thorax black. Abdomen reddishochreous. Forelegs blackish-brown, underside reddish-ochreous; posterior legs reddish-ochreous. Forewings elongate-triangular, costa rounded, hindmargin obliquely rounded, creamy white, with fuscous-brown lines and fasciæ. Costal line fuscous-brown, broad at base and touching inner margin near base, and attenuated to \frac{1}{2} costal—a line from point of this costal line at \frac{1}{2} costa, irregularly dentate to \frac{1}{3} inner margin; a 2nd line from same point on costa, irregularly dentate, to 1 inner margin, enclosed space between these two lines reddish-ochreous and more or less suffused with rich fuscous-brown; a 3rd line from \(\frac{3}{4}\) costa rounded to just before anal angle of inner margin, space between this and hindmargin fuscous-brown—except spot at 3/4 hindmargin creamy white; the 2nd and 3rd lines are joined by a short line just below centre of wing; discal spot on first line near costa, or sometimes absorbed in 1st line: cilia brown and white. wings reddish-ochreous, with diffusion of smoky-black at apex, narrowly attenuated to just before 1 hindmargin; cilia light ochreous.

Brisbane; rare. Allied to aspectatella, but is larger, and fasciæ lie obliquely inwards, and are differently arranged.

COMARCHIS OBLIQUATA, n.sp.

 $\Im Q$. 14 mm. Head, and dorsum of thorax ochreous; face, palpi, antennæ, sides of thorax, abdomen ochreous-fuscous. Legs brownish-ochreous. Forewings elongate, costa rounded, hindmargin obliquely rounded, inner margin sinuate, whitish-ochreous; markings fuscous, a narrow costal line from base to $\frac{2}{3}$, extended at base interruptedly or continuously to inner margin; a line just below costa at $\frac{1}{4}$, enclosing a suffused grey to costa and obliquely to posterior end of costal line; 1st line from $\frac{2}{3}$ costa obliquely to $\frac{1}{3}$

inner margin irregular, sparsely denticulate; 2nd line from \$\frac{1}{5}\$ costa obliquely to \$\frac{2}{3}\$ inner margin, denticulate, enclosed space between 1st and 2nd lines suffused with fuscous-ochreous, and irrorations of black, and holding a small black discoidal spot almost touching 1st line; 3rd line from apex of costa to anal angle of inner margin, sinuous, suffused near apex and broadly so at anal angle; fuscous spot in middle of hindmargin encloses with 3rd line an ochreous space crossed by dark fuscous veins; cilia ochreous with spots of fuscous. Hindwings ochreous-grey, darker grey towards hindmargin; cilia ochreous with grey spots.

Melbourne; Brisbane. Near C. staurocola.

COMARCHIS ASPECTATELLA, Walk. Brisbane.

COMARCHIS LUNATA, n.sp.

 $\Im Q$. 16 mm. Head and face white, palpi black, antennæ grey. Thorax black, anteriorly and posteriorly white. Abdomen yellow-ochreous. Forewings elongate, dilate, costa gently rounded, hind-margin oblique, straight, covered with dark fuscous, excepting a white lunule from near base to near middle of inner margin, a white band from $\frac{3}{4}$ costa to $\frac{3}{4}$ inner margin divided obliquely near inner margin into two by bar, and 5 dentate white marks on hindmargin; small black discal spot edged with ochreous near centre of wing. Hindwings yellow, with smoky-grey fascia from apex attenuated towards hindmargin.

Brisbane.

Anestia inquinata, n.sp.

3.19-20 mm.—Q. probably apterous. Head ochreous-grey, line between antennæ grey. Palpi short, black. Antennæ ochreous, pectinations grey. Thorax ochreous-grey, lined anteriorly, laterally and posteriorly with black lines. Abdomen ochreous. Forewings elongate-triangular, costa slightly rounded, apex rounded, hindmargin obliquely rounded; light fuscous with lighter scattered

scales; semicircular spot in centre of inner margin creamy-ochreous, a second spot irregularly rhombic obliquely from 1st, and touching costa fuscous-grey, often indistinct; in some specimens two small creamy dots on inner margin at $\frac{1}{3}$ and just before anal angle: cilia fuscous. Hindwings orange, bordered with brown fascia, deep at apical angle but attenuated to a line to just before anal angle; cilia grey.

Brisbane.

ASURA LYDIA, Don. Brisbane; Melbourne.

Asura cervicalis, Walk. Brisbane; and Victoria near the coast.

ASURA AURATA, var.

This appears to be a climatic variety of Λ . cervicalis; it is smaller, and while the southern type is intensely black this is intensely orange. In a large series the markings, though somewhat variable, are, relatively speaking, alike in the two types.

Spilosoma Brisbanensis, n.sp. (included with S. fuscinula, Walk.).

 $\Im Q$. 35-41 mm. Head reddish-fuscous. Palpi and antennæ black. Thorax fuscous with central and lateral black stripes from behind collar. Abdomen rose-red, with dorsal, lateral and ventral rows of black spots. Legs black, femora rosy, fuscous above. Forewings, costa slightly rounded, hindmargin rounded; in \Im ochreous, in \Im fuscous; markings black, a well defined bar on basal third, in some specimens filling basal half of costa; discal spot near costa at $\frac{1}{2}$, a black line on inner side of lower median vein occupying middle third very narrow in \Im , in some \Im specimens duplicated, in a very few trebled; a narrow bar from near base close to and parallel to inner margin, interrupted in the third fourth, and often only a dot in \Im in basal half; near \Im costa are two small contiguous spots, and just below opposite to median line are two other smaller dots; from apex to near angle of hindmargin

a series of short longitudinal bar spots; in Q a second series runs diagonally from apex of hindmargin to $\frac{3}{4}$ of inner margin. In many specimens some or nearly all markings absent. Hindwings rosy, large discal spot, broad fascia close to and parallel with hindmargin, more or less interrupted in \eth , rarely interrupted in Q.

This species is I am persuaded quite distinct from the following, $S.\ quinquefascia$. I have seen about 200 specimens from Brisbane neighbourhood and they are all constant as follows:—the markings of the inner $\frac{2}{3}$ of the forewings are sparse, being confined to the central longitudinal bars, the transverse fasciæ found in the next species are absent, the markings of the outer third hardly form into fasciæ, being short and more or less separated bars. The fascia of the hind wing is separated from the hindmargin by a well-defined border. The tendency is to sparsity of markings; the Q is always fuscous.

SPILOSOMA QUINQUEFASCIA, n.sp. (included in S. fuscinula, Walk.).

The distinguishing feature in this species is the transverse fasciæ of the forewings, of which there are five; 1st is near the base, and consists of short bars or joined into a contiguous band; 2nd from \(\frac{1}{3}\) costa to near \(\frac{1}{4}\) and thence in a curve to \(\frac{1}{3}\) inner margin, in some specimens narrowly interrupted; 3rd from 2/3 costa twice waved outwards and from median obliquity to 1/2 of inner margin, generally united to discal spot; 4th from 4 costa to inner margin, in some specimens interrupted once or oftener in middle third; 5th on hindmargin, in some frequently interrupted, often covering hindmarginal line; in & these fasciæ are often more or less confluent, in Q they are more deeply banded and give the insect a rich black appearance, often almost to leaving only lines of ground colour. The basal costal bar often curves into 2nd fascia. The thorax is often entirely black. The fascia of the hindwing is broader than in S. Brisbanensis, and leaves only a narrow hindmarginal line of ground colour.

Meyrick in his monograph description of *S. fuscinula* appears to have included both species. I have a long series of *S. quinquefascia* from Victoria, and they are quite distinct from the Brisbane species. It is difficult to say to which type the name of *S. fuscinula* was first given. Both have evidently been included. I would suggest the more descriptive name *S. quinquefascia* for those from the south with the transverse bars.

Areas marginata, Walk. Brisbane, Gippsland.

Deiopeia pulchella, L. Brisbane, Australia generally.

HYPSIDÆ.

NYCTEMERA AMICA, White. Brisbane to Melbourne. NYCTEMERA TERTIANA, Meyr. Port Douglas to Brisbane. NYCTEMERA CRESCENS, Walk. Port Douglas to Mackay. NYCTEMERA SEPARATA, Walk. Cape York to Mackay. NYCTEMERA CRIBRARIA, Cl. Cape York to Brisbane. AMERILA ASTREAS, Drury. Cape York. AMERILA BRACHYLEUCA, Meyr. Cooktown to Brisbane AMERILA SERICA, Meyr. Rockhampton and Gayndah. AMERILA RUBRIPES, Walk. Cooktown to Brisbane. HYPSA BASILISSA, Meyr. Cooktown and Cairns. HYPSA DAMA, F. Cape York to Mackay. HYPSA PLAGIATA, Walk. Bowen to Brisbane. HYPSA CARICE, F. Cape York to Mackay. HYPSA AUSTRALIS, Boisd. Mackay (Turner). HYPSA NESOPHORA, Meyr. Brisbane; N. S. Wales. HYPSA CHLOROPYGA, Walk. Cape York to Mackay. DIGAMA MARMOREA, Butl. Duaringa to Brisbane.

SYNTOMIDIDÆ,

AGAPHTHORA MELANORA, Meyr. Cape York.

AGAPHTHORA SPHENODES, Meyr. Cairns.

HYDRUSA ECLIPTIS, Meyr. Cooktown and Port Douglas.

HYDRUSA STELOTIS, Meyr. Cooktown.

HYDRUSA PYRRHODERA, Meyr. Cape York to Port Douglas.

HYDRUSA ANGUSTIPENNA, n.sp.

JQ. 19-25 mm. Head and palpi black. Antennæ black. Thorax black. Collar orange-red. Abdomen yellow or orange, base of segments black, anal segment entirely black. Forewings elongate-triangular. Costa straight, apex rounded, hindmargin very obliquely rounded, black, spots 4, small in J, moderate in Q, yellow, translucent, dividing wing into fifths: 1st basal fifth ground colour; 2nd two spots, costal one triangular, inner one lunular, nearly extending to anal angle; 3rd fifth ground colour; 4th fifth two spots, inner one divided by sub-median vein, subcostal one also divided and sometimes into three in Q: cilia brown-red. Hindwings scant, less than half expansion of fore wings, black with one central orange-red spot; cilia brown-red.

Coast nr. Brisbane.

HYDRUSA HYALOTA, Meyr. Cape York.

HYDRUSA LEUCACMA, Meyr. Cooktown to Brisbane.

HYDRUSA CYANURA, Meyr. Brisbane.

HYDRUSA ANTITHETA, Meyr. Gayndah.

HYDRUSA PARAULA, Meyr. Cooktown to Brisbane.

HYDRUSA ANEPSIA, Meyr. Cooktown.

1088 ON QUEENSLAND AND OTHER AUSTRALIAN MACRO-LEPIDOPTERA,

HYDRUSA PYROCOMA, Meyr. Rockhampton.

HYDRUSA SYNEDRA, Meyr. Rockhampton.

HYDRUSA HESPERITIS, Meyr. Cape York.

HYDRUSA MACROPLACA, Meyr. Brisbane; Sydney.

HYDRUSA NESOTHETIS, Meyr. Brisbane; Murray R.

HYDRUSA APERTA, Walk. Queensland; N.S. Wales.

HYDRUSA ANNULATA, F. Cooktown to Maryborough.

HYDRUSA INTENSA, Butler. Cooktown to Brisbane.

HYDRUSA PHEPSALOTIS, Meyr. Maryborough.

HYDRUSA ESCHATIAS, Meyr. ? Queensland.

HYDRUSA BICOLOR, Meyr. Cairns.

Choromeles geographica, Meyr. Rockhampton to Brisbane.

CHOROMELES STREPSIMERIS, Meyr. Bowen.

EUCHROMIA POLYMENA, L. North Australia.

EUCHROMIA IRUS, Cr. Cape York and Cooktown.

ZYGÆNIDÆ.

HESTIOCHORA XANTHOCOMA, Meyr. Duaringa.

PROCRIS CORONIAS, Meyr. Maryborough.

PROCRIS SUBDOLOSA, Walk. Cape York to Brisbane; Melbourne.

Procris viridipulverulenta, Guér. Duaringa; Melbourne.

BOMBYCES, Family LIPARIDÆ.

TEARA BARNARDI, n.sp.

39. 38 mm. 3. Head ferruginous-brown. Antennæ drabbrown, pectinations long. Thorax ferruginous-brown with tufts

of cream-coloured hairs, a small tuft enveloping root of each antenna. Abdomen black, terminal segment and anal tuft of hairs ferruginous-brown. Forewings triangular, dilate, costa rounded at base, thence obliquely straight, apex and hind margin rounded, greywhite, with fuscous markings; a narrow line extends along costa from base to ±; from end of this obliquely to middle of inner margin is the 1st broad bar of fascia; from just before apex of costa a second rounded bar, symmetrical with hindmargin, spans the wing to \frac{4}{5} inner margin, beyond this a sub-marginal line; this is united along veins with 2nd bar by short lines, and forms eight ground-coloured spots between the lines: cilia same colour as markings, fulvous. Hindwings grey-fuscous, with a darker shade bar just before middle of wing, and a 2nd at 3, both symmetrical with hindmargin—the latter is edged by a darker line, shot with ferruginous, enclosing eight cream-coloured spots; cilia creamcolour.

Q. Head and thorax deep ferruginous-brown. Antennæ drabbrown, pectinations $\frac{1}{3}$ length of those in \mathfrak{F} . Forewings ochreousyellow, dusted freely with chocolate-brown; markings deep chocolate-brown; the brown dustings become a line on costa from $\frac{1}{3}$ to apex, and they almost become a suffusion in middle of wing from base to first bar of fascia: 1st bar from $\frac{2}{3}$ costa to $\frac{1}{2}$ inner margin, 2nd bar from $\frac{5}{6}$ costa to $\frac{5}{6}$ inner margin, sub-marginal fine line—between line and 2nd bar are lines separating eight ochreous-yellow spots: cilia chocolate-brown with small ochreousyellow points. Hindwings and cilia dark fulvous with light ochreous-yellow spots near hindmargin, and yellow points in cilia.

Duaringa, Queensland.

The sexes of this moth are widely different. They were bred from a batch of caterpillars by Mr. Barnard of Duaringa, after whom I am pleased to name the species.

TEARA ARGENTOSA, n.sp.

3. 38, Q. 46 mm. Head and thorax cream colour, long hairs on head and thorax creamy-white. Antennæ brown. Forewings

elongate, dilate, costa nearly stright, hindmargin obliquely rounded, cream colour, freely irrorated with silver and sparingly dusted with ochreous-brown; markings faint, light ochreous-brown; discal spot near apex of cell small and often indistinct; a bar or fascia from $\frac{4}{5}$ costa to $\frac{3}{4}$ inner margin, more distinct in \mathcal{J} than in \mathbb{Q} ; a sub-marginal denticulate line, united by dentations (sometimes indistinctly marked) with a marginal line, and enclosing ground colour dots: cilia cream colour. Hindwings cream colour in \mathcal{J} , light brown in \mathbb{Q} , a faint suffusion near base, a band from $\frac{3}{4}$ costa to $\frac{3}{4}$ inner margin, a sub-marginal and a marginal line on hindmargin light ochreous-brown; the sub-marginal and marginal lines are connected by short lines and enclose spots of ground colour; these marks are faint and more of a light brown in \mathbb{Q} ; the long hairs on inner margin are light brown; cilia cream colour.

Duaringa, Queensland. (Mr. Barnard).

TEARA PROTRAHENS, n.sp.

¿Q. 27-30 mm. Head, palpi, antennæ ochreous-brown. Thorax ochreous-brown. Abdomen ochreous-brown, base of each segment black, terminal tuft ochreous-brown. Forewings elongate-triangular, with costa rounded, hindmargin very obliquely rounded, grey irrorated with brown and black scales; very large discal spot beyond ½ and near costa, creamy colour with centre shade of brown; a sub-marginal row of eight cream colour spots and interrupted cream colour marginal line, in ♀ a line, in ♂ a broader band and ochreous: cilia ochreous and brown. Hindwings smoky-black: in ♂ cream colour row of hindmarginal spots, reduced in ♀ to three small ochreous dots next apical angle; cilia in ♂ ochreous, in ♀ smoky-brown and ochreous. The ♂ is in general appearance lighter than ♀.

Brisbane; rare.

PORTHESIA (EUPHROSTIS) COLLUCENS, n.sp.

3Q. 26-34 mm. Head snow-white. Palpi ochreous. Antennæ mid rib white, pectinations ochreous-grey. Thorax snow-white.

Abdomen white, but hairs short, scattered, easily rubbed off, and showing ochreous-brown body colour. Forewings triangular, dilate, with costa rounded, hindmargin obliquely rounded, and inner margin rounded; snow-white; raised shining silvery lines give the appearance of corrugations, eight or nine of these stretch from near, but not touching inner border, rising at equal distances along the margin, the first four or five reach to cell, the others diagonally and irregularly reach to just before costa; the veins are more or less silvered white: cilia snow-white. Hindwings plain snow-white; cilia snow-white.

This beautiful species can best be described as imitative of water marked snow-white silk.

Brisbane, a pair in 1888.

BOMBYCES, Family SATURNIDÆ.

Antheræa intermedia, n.sp.

3. 125-160, Q. 130-170 mm. Head and palpi red-brown. Antennæ brown. Thorax red-brown, collar conspicuously white. Abdomen red-brown. Forewings broadly triangular, costa arched, apical half and apex rounded, hindmargin sinuous and obliquely rounded, red-cinnamon-brown. Costal band continuous with collar, attenuated to just before apex, slaty-purplish, freely dusted with grey and white on border, browner towards apex; large black blotch at termination of costal band; a short bar of chocolate-brown 1 to 1 inch long near \(\frac{1}{3}\) costa, not touching costal band, no white on inner side; a larger bar of like colour from \(\frac{1}{4} \) inner margin for two-thirds across wing to opposite \(\frac{1}{6}\) costa; \(a\) double bar from \(\frac{3}{5}\) inner margin to just before the black blotch near apex of costa, inner bar deep chocolate-brown, outer bar slaty or purplish-brown, bars wavy, and space between ochreous-brown; a circular discal ring occupying middle third between outer bar and costa deep chocolate, finely edged with white on inner margin nearest costa, translucent spot in middle a mere round dot; a broad hindmarginal ochreous-brown

band, apex suffused red centred with ochreous-white: cilia ochreous-brown. Hindwings coloured as forewings; a rich chocolate waved and curved bar from \(\frac{1}{3}\) costa to \(\frac{1}{3}\) inner margin, thence along inner margin to second bar which reaches from 3 inner margin and in a curved line gradually nearing margin to 5 costa; a marginal band bordering inner and hindmargins ochreous-brown, as in forewings; discal rings broadly black, with a blue and black line edging inner margin nearest base of wing, and occupying the middle third of space between the two chocolate bars-translucent spot a fine dot only; cilia as forewings. On the underside of wings fuscous and smoke-coloured scales are dusted thickly between discal ring, costa and outer bar, forming a suffusion over forewings and over all excepting middle third of hindwings. The double bar becomes a crimson-red band along inner half of forewings. The hind band alone is seen on hindwings, of which the inner third is crimson-red, whence it is gradually suffused with smoky-brown.

The species of Antherea are in many cases very variable. A. janetta varies exceedingly. So does A. eucalypti. Other species are less variable. Many are closely allied in general appearance. It is only from a study of the creatures in nature, and from a long series of specimens, that we can hope to define the various species. A. intermedia comes very near to A. eucalypti. The caterpillar is much more gaudily coloured in the former. eucalypti is much more generally distributed. I have found it from Melbourne to Cooktown. A. intermedia is found in the Gippsland zone. I found it 800 to 1000 feet high in Gippsland. The Gippsland fauna comes down to sea-level at Brisbane. This evidently proves that the rainfall has more to do with the locale of many species than the differences of heat and cold. I have obtained scores of Lepidoptera in Gippsland at 800 to 1200 feet, and in Brisbane at sea-level only. The cocoon of A. intermedia is larger, more silky and shining than that of A. eucalypti. relative size of the sexes is more nearly alike in A. intermedia. The colour is constant in A. intermedia. It varies from grey, brown, drab, cream, fulvous, &c., in A. eucalypti The triangular white blotch on the costa in A. eucalypti is absent in A. intermedia.

The collar is snowy-white, and not dirty grey-white as in A. eucalypti. The marginal lines on both wings and the double bar with the intermediate suffusion distinguish A. intermedia. But the most striking character is the distance of the discal rings from the bars. In A. eucalypti they touch, or nearly touch, the diagonal transverse bar in the forewings, and almost touch the single bar and suffusion in the hindwings. In A. intermedia they are conspicuously and constantly distant. A. intermedia appears to approach more nearly to a species which feeds on Loranthus, and which I have not yet been able to determine.

Gippsland and Brisbane.

GEOMETRINÆ, Family GEOMETRIDÆ.

PROBLEPSIS CLEMENS, n.sp.

Q. 40 mm. Head and collar blackish, lower half of face white. Palpi blackish-grey. Antennæ whitish-ochreous. Thorax and abdomen white. Legs ochreous above, white beneath. Forewings triangular, costa gently arched, hindmargin obliquely rounded; snow-white; lines or narrow bars across wing water-grey, 1st line 1/4 costa to 1/4 inner margin; 2nd line rounded near costa, but not touching costa, at $\frac{3}{5}$ to $\frac{2}{3}$ inner margin; 3rd line narrower, symmetrical with 2nd line from $\frac{3}{4}$ costa to $\frac{4}{5}$ inner margin; 4th line a row of small circular spots between veins, lighter on inner half, sub-marginal line just beyond this, fine and indistinct; marginal line very fine and distinct; a small discal spot just before 2nd line, subtended by a short indistinct line or suffusion and surrounded by a suffusion of silvery scales, a few sparsely scattered silvery scales toward apex, and others crowded along 2nd line toward inner margin, and just before inner margin as a broad suffusion to first ilne at 1/4 from inner margin: cilia snow-white. Hindwings with hindmargin rounded, snow-white; a very narrow linear transverse discal spot margined on inner side with silvery scales, lines as in forewings, excepting that first line is wanting; suffusion of silvery scales in a space bounded by a line from \frac{1}{3} inner margin through 1094 ON QUEENSLAND AND OTHER AUSTRALIAN MACRO-LEPIDOPTERA,

discal spot to near apical angle of hindmargin, and by inner and hindmargins, suffusions very thick near inner border, more sparse and scattered toward hindmargin; cilia snow-white.

One specimen; Brisbane.

Appears to come nearest to P. sancta of the Australian species.

lodis speciosa, n.sp.

Q. 32 mm. Head green, fillet green. Palpi brown, terminal joint white. Antennæ light brown. Thorax bright pea-green, with a conspicuous dorsal white posterior spot. Abdomen green, with a white dot on dorsum of each segment; lower half of sides, undersurface and anal segment white. Forewings with costa arched, hindmargin rounded and crenulated, rich pea-green, thinly scaled; a white dot in costa near base, a second at $\frac{1}{6}$, a third at $\frac{1}{3}$, other minute white dots, indistinct, irregularly toward apex; a white dot at 1 inner border; an indistinct row of white dots from 3 costa to 3 inner margin; a few minute white dots scattered irregularly on inner margin and on veins all over the wing, and more conspicuous white dots on apices of hindmarginal crenulations: cilia green and white. Hindwings with hindmargin rounded, bent at vein 4, and crenulate, rich pea-green, minute white dots with difficulty detected sparingly scattered over wing, apices of crenulations of hindmargin white; cilia green and white.

Taken by Mr. Turner near Mackay. Allied to I. iosticta, Meyr.

AGATHIA ASTERIAS, Meyr. Brisbane; one specimen.

AGATHIA LÆTATA, Fabr.

One specimen of this Indian species taken at Brisbane by Mr. Wild, in Museum collection, not previously recorded from Queensland.

HYPOCHROMA VIRIDICATA, n.sp.

3. 45 mm. Head grey with dots of green, crown green. Palpi grey. Antennæ light brown, shortly pectinated. Collar reddish-

brown. Thorax grey-green, epaulettes blue-green. Thorax greygreen, sides and anal tuft reddish-ochreous. Forewings, costa slightly wavy, apex rounded, hindmargin rounded, rich green, freely interspersed with grass green, and dots of darker green; markings green-black and reddish-brown; a narrow line near base; a 2nd rounded line from a large spot at \frac{1}{4} \costa to \frac{1}{4} \text{ inner margin}; a large spot at 3 costa and a line within this running to 2nd line at \frac{1}{2} and ending in a blotch which covers discoidal spot; 3rd line from \(\frac{3}{4}\) costa, dentate, curved outward and at \(\frac{1}{3}\) inward to \(\frac{1}{3}\) inner margin; 4th line from 5 costa to 5 inner margin, these two lines joined in the centre by a conspicuous black bar; 5th line irregular and interrupted, just beyond 4th; 6th line marginal: cilia grey-green. Hindwings as forewings; markings as forewings but 2nd and 3rd brown or black near centre of wing, veins brown and green, inner margin broadly reddish-ochreous; cilia brownishgreen. Undersurface, forewings red-ochreous, discoidal spot black, bar from near 6 costa to near anal angle narrowed in centre, deep red with spots of black near centre, a black comma mark in centre of wing at 1. Hindwings as forewings, discoidal spot red; between this and outer broad band is a line from 5 costa to centre of wing--all marks on hindwings cinereous-red.

Brisbane; in dense scrub; November; very rare. A very fine species. Allied to *H. hypochromaria*.

HYPOCHROMA MACULATA, n.sp.

Q. 44-46 mm. Head brown or grey. Palpi black. Antennæ brown. Thorax brown or grey, with 3 or 4 small black dots on either side of basal segments. Forewings triangular, dilate, costa straight, apex rounded, hindmargin rounded, light brown or light grey, with darker markings and spots; small dots along whole length of costa, with a large one at $\frac{1}{4}$, one at $\frac{3}{4}$ and one at $\frac{5}{6}$; a row of suffused dots near the base, a 2nd row of irregular suffused dots at $\frac{1}{8}$ costa in a circle to $\frac{1}{4}$ inner margin, a discal spot in centre of cell, more or less in a line of suffusion

with dot at $\frac{1}{2}$ costa to a dot at $\frac{1}{3}$ inner margin; a broad fascia of suffused darker ground colour from between dots at $\frac{3}{4}$ and $\frac{5}{6}$ costa to space between $\frac{1}{2}$ to $\frac{3}{4}$ inner margin, a darker blotch near hind-margin of this in centre, and another near inner margin; a sub-marginal interrupted crenulate line; a row of black hindmarginal dots between veins: cilia brown or grey. Hindwings marked as forewings, with small, faintly marked discal spot; undersurface light-ochreous with large black discal spot in forewings, small in hindwings; 1st line at $\frac{1}{5}$ costa or $\frac{1}{5}$ inner margin, faint; median line beyond discal spot at $\frac{1}{2}$ costa angled and thence to near $\frac{1}{2}$ inner margin, both lines wanting or faintly marked on hind wings. Very broad and smoky-brown hindmarginal fascia through both wings, touching hindmargin in forewings near the middle and in several points near anal angle, and in hindwings at apical and anal angles.

Mackay (Mr. Turner). Two specimens; one is grey, the other is fuscous-brown, but all the markings are alike.

Hypochrona Turneri, n.sp.

Q. 36 mm. Head and palpi greenish-ochreous. Antennæ greenish-grey. Thorax brown with tufts of green hairs. Thorax ochreous-drab. Forewings, costa nearly straight, hindmargin crenulate, rounded, ochreous-green shaded with purplish-grey suffusions and markings; a dark chocolate or blackish denticulate median line at $\frac{2}{3}$ costa, angularly toward hindmargin, thence straight for $\frac{1}{4}$, and thence obliquely to $\frac{1}{2}$ inner margin; another line less distinct at $\frac{1}{3}$ costa, denticulate and rounded to $\frac{1}{5}$ inner margin; a broad purple-grey suffusion at base, narrowly separated into two blotches in centre, a second suffusion of same colour between chocolate lines along costa bordering either line, and filling space on inner $\frac{2}{3}$ of wing, this contains indistinctly marked discal spot; a narrow suffusion and a darker colour line diagonal to costa at $\frac{4}{5}$ costa, a green-purple bar from $\frac{3}{4}$ inner margin to middle of wing, thence diagonally to near hindmargin at $\frac{1}{4}$ from

apical angle, here it turns on itself and extends near hindmargin to anal angle; space included purple-grey, marginal line chocolate-grey: cilia brown, grey, and green. Hindwings as forewings, with a patch of reddish-ochreous on middle third of inner margin, and very indistinct discal spot or suffusion. Undersurface of wings ochreous shaded with purple-grey, from base to median line, discal spot on forewings conspicuous black with white suffusion toward median line and costa, discal spot on hindwings pale, indistinct; median line $\frac{2}{3}$ costa to $\frac{2}{3}$ inner margin on forewings, and in a line from beyond $\frac{1}{2}$ costa to $\frac{1}{2}$ inner margin hindwings. A broad grey-black fascia from costa just beyond median line, touching hindmargin near anal angle in forewings, and at apex and anal angle in hindwings.

Mackay; one specimen sent by Mr. Turner; after whom I have great pleasure in naming the specimen. This species is allied to *H. acanthina*, Meyr.

NOCTUÆ, Family ORTHOSIDÆ.

LEUCANIA AUREOLA, n.sp.

 \Im . 38 mm. Head, palpi, thorax and abdomen ochreous-brown. Antennæ ochreous above, smoky-brown beneath. Legs ochreous-brown. Bunch of long hairs on undersurface and centre of abdomen black. Forewings, costa rounded before apex, hindmargin rounded, ochreous-brown, with veins and finely lined subvenations reddish-brown; a strongly marked brown line midway through wing to $\frac{2}{3}$, parallel with inner margin; a small black discal spot almost touching this line just beyond $\frac{1}{2}$, another small spot just outside first, an oblique brown line from just before apex of costa becoming a suffusion to discal spot, an oblique brown line, suffused at apex, but narrowing into a series of dots to $\frac{3}{4}$ inner margin, a few other irregular indistinct suffused brown spots and dots, and grey-black marginal dots on veins: cilia ochreous-brown. Hindwings ochreous-brown, freely covered with smoky-brown scattered scales, which become a dark suffusion on hind half of wing; cilia

as forewings. Undersurface of all wings creamy-ochreous and covered with shining gold scales. Marginal dots on veins black. Brisbane; rare; dense scrub; November.

LEUCANIA FUMATA, n.sp.

δQ. 31-35 mm. Head smoky-grey. Palpi grey. Antennæ brownish-grey. Thorax white, smoky-grey anteriorly. Thorax ochreous-white. Forewings elongate, gradually dilate, with costa gently rounded, hindmargin rather obliquely rounded, milk white, shining, shaded irregularly with smoky-grey; small brown discal spot near centre of cell, often indistinct; veins bounding cell, and veins nearing hindmargin smoky-grey: cilia greyish-white. Hindwings grey-white, with broad band of suffused smoke colour on hindmargin, lighter toward anal angle; cilia as forewings.

Brisbane; rare.

I sent a specimen of this rare moth to Mr. Meyrick, who returned a note, unidentifiable. I presume it became greased in transit, to which it is very liable, and in which condition it would look worn and rubbed. In the fresh series, the shining wings, milky-white forewings shaded with smoke stains as it were, readily distinguish it from any other species with which I am acquainted.

PYRALIDINA, Family PYRALIDIDÆ.

BALANOTIS ARCTANDALIS, n.sp.

3Q. 25-35 mm. Head orange. Palpi black, grey laterally. Antennæ ochreous-grey. Thorax green-grey, with two black dots in front, and two diamond-shaped black spots in centre and posteriorly across dorsum. Abdomen ochreous-orange laterally, green-grey on back, with a centre row of diamond spots and a row diagonally with these on either side, black, terminal tuft black with a shade of orange in centre. Legs green-grey and black, posterior pair on upper side orange on coxæ and femora,

and alternately orange and black on tibiæ. Forewings elongatetriangular, gently dilate, costa nearly straight, hindmargin rounded, green-grey, with marks and shadings of grey and black in various shades; spot in centre near base, a larger one at \frac{1}{8} \costa, a broader and diffused one immediately beyond on costa, a smaller just beyond in middle and one nearer base on inner margin-a broad fascia from $\frac{1}{3}$ costa deeply dentate to $\frac{1}{3}$ inner margin, widened at inner margin, a discal spot at ½ near costa, a 2nd fascia at \(\frac{2}{3} \) costa sinuous and dentate to \(\frac{4}{5} \) inner margin, a broad suffusion from just beyond to apex, on inner half of wing narrowed to interrupted horseshoe dots, to anal angle of hindmargin; a sub-marginal line of deep black dots, a marginal black-grey line: cilia black-grey. Hindwings with hindmargin rounded, costa for 3 and whole inner margin rich orange colour, rest of wings coloured as forewings but with more white: spot near base of costa orange, large spot in middle of wing at 1, and a band from near costa just before sub-marginal spots on middle 2 of wing, blue-white: a suffused line near base in centre and between costal orange and white, centre spot green-grey; a fascia at 1 between orange bands and bounded faintly on either side with orange-black: a broad suffusion from apex of costa, breaks at 1/4 into horseshoe spots on inner side of white band and expands in suffusion near anal angle, black: sub-marginal spots deep black; cilia as forewings.

Brisbane; rare; dense scrub.

This handsome species comes near B. carinentalis.

Postscript.—Since this paper left my hands I have come to the conclusion that it might perhaps be better to consider the foregoing species (B. arctandalis) as a well-marked variety of B. didymalis, Walk. It does not entirely agree with Walker's description in which the markings on the under side are said to be obsolete, whereas in my species (or variety) the under surface is rich orange, and the markings deep black.

NOTES AND EXHIBITS.

Mr. Skuse exhibited specimens of Diptera as follows:—(1) Cecidomyidæ bred from small brown scale-like discolorations occurring very numerously on the leaves of *Eucalyptus corymbosa* common about Sydney; (2) another species bred from globular, valvate, galls found on the hill-pine (*Frenela Endlicheri*) near Wagga Wagga, N.S.W.; (3) specimens of a species of *Phora* bred from the larvæ of *Oiketicus elongatus*, Saund.

Mr. Froggatt showed the following exhibits:—(1) a specimen of a case-moth Oiketicus elongatus, Saund., together with a number of specimens of parasitic Hymenoptera (Hockeria sp., Fam. Chalcidida) bred from a batch of dipterous larvae (Tachina sp.), similar to those exhibited by Mr. Skuse at the September Meeting, parasitic upon the case-moth; (2) specimens of parasitic Hymenoptera (Fam. Braconidae) which destroy the caterpillars of Teara tristis; (3) a family of the young caterpillars of a case-moth (Oiketicus Hübneri, Saund.), which when hatched a fortnight ago were little active black caterpillars, and immediately commenced to make their cases out of any suitable material that came to hand.

Mr. Fletcher exhibited a collection of about 110 species of plants from the neighbourhood of Wagga Wagga, which Dr. Woolls, with his customary kindness and enthusiasm, had been good enough to determine. Among the more interesting species represented perhaps the most noteworthy are Bedfordia salicina, DC., Stuartina Muelleri, Sond., Vittadinia australis, A. Rich., (two vars.), among the Composite; and Caladenia clavigera, A. Cunn., (Orchideæ). A few common Port Jackson plants were met with, and introduced plants were found to be very numerously represented.

The President exhibited a number of parasitic Nematode worms (Ascaris sp.), from the alimentary canal of the brown snake (Diemenia superciliosa), obtained and forwarded by Mr. McCooey.

MONDAY, 30th DECEMBER, 1889.

The President, Professor Stephens, M.A., F.G.S., in the Chair.

Dr. W. Lloyd Mathias was present as a visitor.

Dr. N. A. Cobb was elected a member of the Society.

The President announced that the Annual Meeting would be held on Wednesday evening, January 29th, 1890, to take precedence of the Ordinary Monthly Meeting on the same date.

DONATIONS.

A Pamphlet entitled "Root Matters in Social and Economic Problems." By R. M. Johnston, F.L.S. From the Royal Society of Tasmania.

- "Zoologischer Anzeiger." XII. Jahrg., Nos. 319, 320 and 321 (1889). From the Editor.
- "Journal of Morphology." Vol. III., No. 1 (June, 1889). From Dr. W. A. Haswell, M.A.
- "Report of the First Meeting of the Australasian Association for the Advancement of Science, held at Sydney, N.S.W., in August and September, 1888." From the Association.

- "Feuille des Jeunes Naturalistes." No. 229 (November, 1889). From the Editor.
- "Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou." Tome XV., Liv. 6 (1889). From the Society.
- "Journal and Proceedings of the Royal Society of New South Wales." Vol. XXIII., Part I. (1889); "Catalogue of the Scientific Books in the Library," &c. Part I.—General Catalogue. From the Society.
- "Archiv für Naturgeschichte." 53rd Jahrg., Band II., Heft 1 (1887); 55th Jahrg., Band I., Heft 2 (1889). From the Editor.
- "Comptes Rendus des Séances de l'Académie des Sciences, Paris." Tome CIX., Nos. 12 and 13 (1889). From the Academy.
- "The Victorian Naturalist." Vol. VI., No. 8 (December, 1889). From the Field Naturalists' Club of Victoria.
- "Geological and Natural History Survey of Canada.—Contributions to Canadian Palæontology." Vol. I., Part 2. By J. F. Whiteaves, F.G.S., F.R.S.C., &c. From the Director.
- "The Journal of Comparative Medicine and Surgery." Vol. X., No. 4 (1889). From the Editor.
- "Bulletin of the American Museum of Natural History." Vol. II., No. 3 (three sheets). From the Museum.
- A Pamphlet entitled "Notes on Certain 'Pores' on the Veins of some Diptera." By Frazer S. Crawford. From the Author.
- "The Transactions of the Entomological Society of London for the year 1889." Part 3. From the Society.

- "Department of Agriculture, Queensland.—Report on Insect and Fungus Pests." No. I. By Henry Tryon. From the Under-Secretary for Agriculture, Brisbane.
- "Archives Néerlandaises des Sciences Exactes et Naturelles." Tome XXIII., Liv. 5 (1889). De la part de la Société Hollandaise des Sciences à Harlem.
- "Berliner Entomologische Zeitschrift." Band XXXIII., Heft 1 (1889); "Stettiner Entomologische Zeitung." 50 Jahrg., Nos. 4-6 (1889). From Sir William Macleay, F.L.S.
- Two Pamphlets entitled "Gums, and a Resin, produced by Australian Proteaceæ;" "Botany Bay or Eucalyptus Kino." By J. H. Maiden, F.L.S., F.C.S., &c. From the Author.
- "Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia." 5th Session (1889-90). Vol. V., Part I., with a Map. From the Society.
- "Proceedings of the Cambridge Philosophical Society." Vol. VI., Part 6 (1889). From the Society.
- "Transactions and Proceedings and Report of the Royal Society of South Australia." Vol. XII. (1888-89). From the Society.
- "The Australasian Journal of Pharmacy." Vol. IV., No. 48 (Dec., 1889). From the Editor.
- "Abstract of Proceedings of the Zoological Society of London, 5th November, 1889." From the Society.
- "The Quarterly Journal of the Geological Society of London." Vol. XLV., Part 4 (No. 180), 1889; "List of Members, &c., 1889." From the Society.

"The Asiatic Society of Bengal.—Proceedings, 1889." Nos. i.-vi. (Jan.-June); "Journal." n.s. Vol. LVIII., Part i., No. 1; Part ii., Nos. 1 and 2 (1889); "The Modern Vernacular Literature of Hindustan." By G. A. Grierson, B.A., B.C.S. ("Journal," Special Number, Part i., 1888). From the Society.

"Proceedings and Transactions of the Royal Society of Canada for the year 1888." (Vol. VI.) From the Society.

A Pamphlet entitled "Notes and Critical Remarks on a Donation of Shells sent to the Museum of the Conchological Society of Great Britain and Ireland." By John Brazier, F.L.S., &c. From the Author.

"Journal of the Royal Microscopical Society of London, 1889." Part V. From the Society.

DESCRIPTIONS OF ADDITIONAL AUSTRALIAN PYRALIDINA.

By E. MEYRICK, B.A., F.E.S.

The following species, mostly new, are additions to the list of Australian *Pyralidina*, and include several forms of considerable interest. They are mostly received from my esteemed and energetic Queensland correspondents, Mr. G. Barnard of Coomooboolaroo, and Dr. T. P. Lucas of Brisbane.

PYRALIDIDAE.

CENTROPSEUSTIS, n.g.

Forehead with projecting tuft of scales; ocelli present; tongue well-developed. Antennæ $\frac{3}{4}$, in $\stackrel{?}{\circ}$ stout, dentate, moderately ciliated, with a fine obliquely projecting spine from near base of stalk above, basal joint moderately large. Labial palpi long, porrected, clothed with dense loose scales, in $\stackrel{?}{\circ}$ bent, in $\stackrel{?}{\circ}$ nearly straight, in $\stackrel{?}{\circ}$ with terminal joint enlarged and excavated internally and clothed with very dense expansible scales above and beneath. Maxillary palpi obsolete. Posterior tibiæ with outer spurs about $\frac{1}{3}$ of inner. Forewings with vein 1a simple, connected by a bar before middle with 1b, 6 approximated or from a point with 9, 7 and 8 out of 9, 10 connected with 9 at a point above 7. Hindwings over 1; veins 4 and 5 closely approximated at base, 7 out of 6, anastomosing with 8 at a point before middle.

A curious and distinct genus, allied to Hypotia.

Centr. astrapora, n.sp.

30. 21-25 mm. Head and thorax whitish-ochreous, more or less mixed with brownish. Palpi whitish, externally fuscous. Antennæ whitish-fuscous. Abdomen whitish-ochreous, segments brownish-tinged except on margins. Legs fuscous, posterior tibiæ whitish. Forewings elongate-triangular, costa gently arched posteriorly, apex obtuse, hindmargin bowed, rather oblique; light brownish-ochreous, costa more brownish anteriorly; a cloudy white longitudinal spot in disc near base, sometimes extended to base, margined beneath by a short blackish dash; a nearly straight silvery-white streak from beneath costa at 2 to 5 of inner margin, posteriorly finely black-margined; a silvery-white streak from beneath costa at $\frac{3}{4}$ to inner margin at $\frac{2}{3}$, rectangularly angulated inwards below middle, anteriorly finely black-margined; space between these streaks ochreous-brown except on costa, with some blackish scales above middle; a closely and acutely dentate cloudy black line from apex to inner margin at 3, nearly obsolete at lower extremity, indented inwards to touch second transverse streak above middle and again in its angulation; space between this line and second streak ochreous brown; space beyond it more or less clouded with fuscous; a whitish hindmarginal line: cilia ochreousbrownish, with a row of blackish spots before middle. Hindwings deep yellow; a moderate dark fuscous hindmarginal band, suffusedly dilated at apex and anal angle; cilia yellowish, on upper half with an interrupted dark fuscous line before middle.

Sydney, New South Wales, in November and December; not often seen at large in the perfect state, but bred in plenty from the larva by Mr. G. H. Raynor and myself. Larva 16-legged, elongate, slender, cylindrical, very active; body transversely wrinkled, with a few long scattered pale hairs; reddish-ochreous on back, ochreous-whitish on sides; dorsal line narrow, ochreous-whitish, irregularly margined and lined with blackish; a broad double blackish lateral line, partially obscured with transverse black wrinkles; a dull ochreous reddish cloudy spot behind each

spiracle; an obscure interrupted blackish subspiracular line; head dull brownish-ochreous, reticulated with whitish, with two broader lines on crown: feeds gregariously in large nests of dense web, a foot in diameter, amongst branches of *Melaleuca genistifolia*; January to March.

SYNTONARCHA, n.g.

Forehead oblique; ocelli present; tongue well-developed. Antennæ $\frac{2}{3}$, in $\frac{1}{3}$ filiform, simple. Labial palpi long, straight, porrected, second joint clothed with rough projecting scales, terminal joint moderate, with loosely appressed scales. Maxillary palpi moderate, triangularly dilated with scales. Posterior tibiæ with outer spurs half inner. Forewings with vein 1 simple, cell in $\frac{1}{3}$ abruptly contracted anteriorly so that upper and lower margins are appressed together in disc from base to near middle of wing, 2 from $\frac{2}{3}$ of cell, 3 from much before angle, 4 and 5 approximated at base, 6 from a point with 9, 7 and 8 out of 9, 11 from $\frac{2}{3}$ of cell, bent upwards towards 12. Hindwings $1\frac{1}{4}$; veins 4 and 5 closely approximated towards base, 7 out of 6 near origin, anastomosing with 8 to middle.

This is a very singular form, superficially perhaps more like some of the *Galleriadae* than anything else, but quite peculiar; structurally it is undoubtedly to be referred to the *Pyralididae*, in the neighbourhood of *Cledeobia* and *Diplopseustis*.

Synt. iriastis, n.sp.

3. 25 mm. Head, palpi, antenne, and thorax light brownish-ochreous. Abdomen fuscous-whitish, basal segment deep yellow-ochreous. Legs fuscous-whitish, anterior pair fuscous. Forewings elongate, posteriorly considerably dilated, costa strongly arched, apex rounded, hindmargin obliquely rounded; light brownish-ochreous, with strong prismatic reflections: cilia fuscous-whitish. Hindwings whitish, semitransparent, with strong purplish and brassy reflections; cilia whitish.

Brisbane, Queensland; one specimen received from Dr. T. P. Lucas.

BOTYDIDAE.

GLYPHODES, Gn.

Glyph. luciferalis, Walk.

Brisbane, Queensland; one specimen received from Dr. T. P. Lucas. Occurs also in New Guinea, Java, and India.

Glyph. microta, n.sp.

Q. 15 mm. Head and thorax ochreous-brown, with a white line above eyes. Palpi dark fuscous, beneath white towards base. Antennæ fuscous-whitish. Abdomen light fuscous. Legs whitish. Forewings elongate-triangular, costa posteriorly moderately arched, apex obtuse, hindmargin bowed, oblique; fuscous, base ochreoustinged; costa suffused with light greyish-ochreous; markings iridescent white, semitransparent, surrounded by a darker suf fusion; a dot on inner margin at 2; a small irregular spot in disc at $\frac{1}{3}$; a transverse suboblong spot in disc before middle, reaching from near costa to below middle; a pentagonal blotch in disc at $\frac{2}{3}$, not approaching either margin; a narrow transverse spot from costa at 4, whence proceeds a slender line close round two lower sides of discal blotch to middle of disc, almost reaching preceding spot, thence very abruptly bent back and running in a sinuate course to inner margin at $\frac{3}{4}$; a blackish hindmarginal line: cilia light fuscous, with a darker line. Hindwings iridescent white, semitransparent; a small dark fuscous spot in disc before middle; a broad fuscous hindmarginal band, nearly of equal width throughout, anteriorly suffused with dark fuscous; cilia whitish, with a fuscous line.

Brisbane, Queenland; one specimen received from Dr. T. P. Lucas. Allied to G. bicolor; it is the smallest known species of the genus.

HYDROCAMPIDAE.

TETRERNIA, n.g.

Forehead vertical; ocelli present; tongue well-developed. Antennæ $\frac{3}{4}$, in \mathcal{F} filiform, moderately ciliated (1). Labial palpi moderate, curved, ascending, slender, with appressed scales, second joint slightly roughened in front, terminal joint moderate, tolerably pointed. Maxillary palpi rudimentary. Posterior tibiæ with middle-spurs nearly equal, (terminal spurs absent, possibly broken, only one posterior leg being present), all tarsi very long. Forewings in \mathcal{F} with a small glandular swelling near base, a small costal projecting tuft of hairs at $\frac{1}{4}$, and small basal tuft on inner margin; vein 1 simple, 3, 4, 5 closely approximated at base, 6 and 7 approximated at base, 9, 10, and 11 rising out of 8. Hindwings 1; veins 4 and 5 stalked from near 3, 7 out of 6 near origin, anastomosing with 8 to middle.

The neuration is to be regarded as the distinguishing characteristic of this genus.

Tetr. teminitis, n.sp.

3. 13 mm. Head, palpi, antennæ, and thorax pale whitish-yellowish. (Abdomen absent.) Legs whitish, anterior pair with apex of joints black. Forewings elongate-triangular, narrow at base, costa posteriorly gently arched, apex obtuse, hindmargin obliquely rounded; ochreous-yellow; a suffused dark fuscous streak along costa from base to beyond middle; an obscure white posteriorly dilated suffusion in disc above middle, extending from near base to \(\frac{3}{4}\), posterior edge parallel to hindmargin; a quadrate yellowish spot in middle of disc, interrupting this suffusion, margined on both sides and above with dark fuscous; an evenly broad curved white black-margined fascia at \(\frac{5}{6}\), parallel to hindmargin, not quite reaching costa or inner margin; an interrupted black hindmarginal line: cilia whitish, with a grey line. Hindwings ochreous-yellow; basal half white, bounded by a nearly straight

dark fuscous streak from beneath middle of costa to above middle of inner margin; an oblique white spot before apex; a moderate straight white blackish-margined fascia at ⁴/₅ parallel to hindmargin from above middle to near inner margin; five small subquadrate black spots on central third of hindmargin; cilia whitish, with a grey line, becoming dark grey opposite hindmarginal spots.

Cairns, Queensland, in September; one specimen received from Mr. G. Barnard.

HYDREURETIS, Meyr.

Hydr. sacadalis, Walk.

(Hydrocampa sacadalis, [sacadusalis], Walk. 963.)

Q. 20 mm. Head and antennæ white. Palpi white, second joint dark fuscous, terminal joint pointed. Thorax white, with two transverse ochreous-yellowish bars. Abdomen white, with two bars and apex pale yellowish. Legs white, anterior tibiæ dark fuscous. Forewings very elongate-triangular, costa posteriorly slightly arched, apex obtuse, hindmargin rather obliquely rounded; white; a subcostal streak of pale fuscous irroration from base to middle; a small fuscous spot in disc beyond middle; a moderate ochreous-yellow fuscous-margined fascia from 2 of costa towards anal angle, below middle acutely angulated and continued through disc to inner margin near base, rather sinuate upwards beneath discal spot; a straight ochreous-yellow fascia, narrowed downwards posteriorly and above margined with dark fuscous, from 5 of costa to near inner margin before anal angle; a moderate ochreous-yellow hindmarginal fascia, margined on both sides with dark fuscous, touching preceding fascia on costa and anal angle, continued along inner margin to middle but gradually suffused and disappearing: cilia grey, with a darker line. Hindwings white; a straight fuscous line from 3 of costa to middle of inner margin; a nearly straight ochreous-yellow fuscous-margined fascia from costa before apex to 3/4 of inner margin; an ochreous-yellow blackish-margined hindmarginal fascia, confluent with preceding on costa, marked

with cloudy-grey apical and subapical spots; cilia whitish, with a grey line marked with blackish, with a black subbasal dot below apex, and two small black spots separated by a white dot above middle.

Sydney, New South Wales, in March; one specimen received from Mr. G. H. Raynor.

SCOPARIADAE.

Eclipsiodes, Meyr.

Eclips. marmaropa, n.sp.

Q. 18 mm. Head and thorax black, with a few yellow-whitish scales. Palpi black, mixed with yellowish-white. Antennæ black. Abdomen dark fuscous, irrorated with yellowish, apex yellow. Legs blackish, sprinkled with yellowish. Forewings elongatetriangular, costa nearly straight, apex obtuse, hindmargin rather obliquely rounded; dark fuscous, irrorated with black, and irregularly sprinkled with whitish-yellowish; a cloudy white subbasal dot in middle, another on base of inner margin, an elongate mark beyond first, and three dots in a transverse series before middle, upper in disc above middle, all ill-defined and obscure; a subcrescentic yellowish-white spot in disc beyond middle, and a smaller spot on submedian fold beneath this; a suffused spot beyond discal crescentic spot; a hindmarginal series of cloudy roundish almost confluent yellow-whitish spots: cilia fuscous, with a darker line, and some terminal scattered yellowish-white scales. Hindwings with veins 4 and 5 stalked, 6 and 7 rising separate; light orange, with a few scattered dark fuscous scales; base and inner margin irregularly suffused with rather dark fuscous; a moderate irregular dark fuscous hindmarginal band, dilated at apex, almost interrupted at anal angle, marked with some yellowish scales indicating a series of obscure hindmarginal spots; cilia fuscous, mixed with yellowish, with a darker fuscous subbasal line.

71

Mount Kosciusko (5000 feet), New South Wales; one specimen in January. The neuration of the hindwings varies somewhat from previously described forms of the genus, but its peculiarities are apparently only exaggerations of the type; in the absence of the 3, its position is sufficiently assured.

ALUCITIDAE.

ALUCITA, Z.

Aluc. xanthodes, n.sp.

3. 15 mm. Head white, crown light ochreous-yellow. Palpi white. Antennæ ochreous - whitish. Thorax yellow - ochreous, spotted with white. Legs white, anterior pair banded with dark fuscous. Forewings and hindwings bright yellow-ochreous, crossed by six irregular white lines; fifth and part of third lines finely margined anteriorly with black, fourth and sixth (subterminal) finely margined posteriorly with black: cilia alternately ochreous and white.

Duaringa, Queensland, in February; one specimen received from Mr. G. Barnard. A very pretty and distinct species.

Aluc. pygmaea, n.sp.

3Q. 8-9 mm. Head and thorax white, speckled with dark fuscous. Palpi white. Antennæ whitish. Abdomen ochreouswhite, sides speckled or suffused with dark fuscous, second segment white with a dark fuscous blotch on each side. Legs white, anterior tibiæ dark fuscous. Forewings and hindwings white, clearly and finely striated transversely throughout with ochreousbrown; six irregular clear snow-white transverse bars, finely margined on both sides with black: cilia wholly whitish.

Duaringa and Brisbane, Queensland, in February; five specimens received from Mr. G. Barnard and Dr. T. P. Lucas. Mr.

Barnard states that they sometimes swarm by thousands in the scrubs. It is a curious and interesting little insect, much the smallest species of the genus.

PTEROPHORIDAE.

TRICHOPTILUS, WISM.

Trich. pyrrhodes, n.sp.

3. 12-13 mm. Head and thorax ferruginous, apex of patagia pale yellowish. Palpi white, upper and lower edge black, confluent towards apex. Antennæ black, dotted with white. Abdomen ferruginous, apex with single obliquely ascending hairpencil. Legs white, longitudinally striped with black, posterior tibiæ and tarsi banded with blackish. Forewings cleft from middle, segments linear; ferruginous, with a few scattered purplish-silvery scales; a short black longitudinal dash above inner margin at $\frac{1}{62}$ and a second in disc at $\frac{1}{3}$; a black transverse dot on base of cleft, and a more or less marked dark fuscous suffused spot below it; first segment with an obscurely indicated light yellowish bar before middle: costal cilia pale yellowish, with a black spot at 1 of first segment, a broader one in middle, and a third at apex; rest of cilia brown with a strong reddish-purple gloss, on upper margin of second segment with some black scales before apex, on lower margin of second segment with a pale yellowish bar at 1/3, preceded and followed by black scales, a narrower bar at 2 and another at apex, both preceded by black scales. Hindwings cleft firstly from 1/2, secondly from near base, segments linear; deep coppery-red, becoming ferruginous at base; cilia brown with a strong purple-reddish gloss, third segment with a large tooth of black scales on inner margin at 2, and one or two black scales at apex.

Duaringa, Queensland, in February and April; three specimens received from Mr. G. Barnard. It is very distinct by the intense reddish colouring, large black scale-tooth of hindwings, and other characters.

OXYCHIROTIDAE.

CENOLOBA, WISM.

Forehead rounded; ocelli very small; tongue developed. Antennæ $\frac{3}{4}$, in \mathcal{F} serrate, moderately ciliated (1). Labial palpilong, straight, porrected, second joint with dense roughly projecting scales, terminal joint moderate, slender, cylindrical. Maxillary palpilorather long, porrected, triangularly dilated with loose rough scales. Abdomen in \mathcal{F} with moderate anal tuft, uncus not developed. Posterior tibiæ with outer spurs $\frac{3}{4}$ of inner. Forewings narrow, gradually dilated, hindmargin deeply cleft to $\frac{1}{2}$, segments elongate-lanceolate; 1 simple, 2 out of 3, 4 from point with 3, 5 and 6 obsolete, 7 from near 9, 8 out of 9, 10 out of 9 below 8, 11 out of 9 near origin. Hindwings narrow, gradually dilated, hindmargin deeply cleft to $\frac{2}{5}$, segments elongate-lanceolate; lower median not pectinated; 2 from before angle, 3 and 4 stalked, 5 short, to base of cleft, 6 from angle of cell, 7 out of 6 near origin, anastomosing with 8 to middle.

This singular genus has been erroneously referred to the *Pterophoridae*. I have elsewhere (Ent. Mo. Mag. Sept. 1889) discussed its affinities, and shown that it is truly referable here, and that its nearest ally is *Epharpastis*.

Cen. obliteralis, Walk.

(Pterophorus obliteralis, Walk. 945; Cenoloba obliteralis, Wlsm., Ent. Mo. Mag. XXI. 175, fig. 2.)

 ochreous sprinkled with dark fuscous; a moderate transverse spot at base of cleft; three small spots on costa between \$\frac{2}{5}\$ and \$\frac{3}{4}\$, second almost confluent with spot at base of cleft; a moderate bar crossing middle of each segment, a narrower one between this and apex, and a dot at apex of each segment: cilia white barred with pale ochreous opposite segmental markings. Hindwings with colour and markings as in forewings, but without costal spots; spot at base of cleft extended to reach inner margin.

Brisbane, Queensland; several specimens received from Dr T. P. Lucas.

PHYCITIDAE.

HEOSPHORA, Meyr.

Under my original description of *H. virginella*, Meyr., I unfortunately confused two species, which I have since been enabled to separate by the acquisition of additional material. As the description is no longer strictly determinable, I here describe both species afresh, retaining the name *virginella* for that which I originally regarded as the typical form.

Heosph. virginella, Meyr.

♂♀. 22-27 mm. Head, palpi, and thorax pale carmine-pink; palpi 4. Antennæ ochreous-whitish. Abdomen ochreous-whitish, basal third golden-ochreous. Legs whitish-pink. Forewings elongate, posteriorly dilated, costa moderately arched, apex obtuse, hindmargin very obliquely rounded; clear carmine-pink, sometimes ochreous-tinged towards costa; a slender white median longitudinal streak from base, becoming indistinct towards hindmargin; inner margin broadly suffused with ochreous-whitish from base to ⅔: cilia light carmine-pink. Hindwings and cilia ochreous-whitish.

Duaringa, Queensland; four specimens received from Mr. G. Barnard.

Heosph. chlorogramma, n.sp.

σ̄Q. 14-17 mm. Head and thorax dull carmine-pink mixed with ochreous-whitish. Palpi 4, light dull pink, above and beneath whitish. Antennæ ochreous-whitish. Abdomen grey-whitish, basal third golden-ochreous. Legs white. Forewings elongate, posteriorly dilated, costa gently arched, apex obtuse, hindmargin obliquely rounded; dull carmine-pink; costa and all veins clearly marked by ochreous-white lines; a slender ochreous-white streak along anterior half of inner margin: cilia light carmine-pink, costal cilia ochreous-white. Hindwings ochreous-whitish; cilia whitish, sometimes rosy-tinged.

Duaringa, Rosewood, and Brisbane, Queensland, in December and March; five specimens.

REVISION OF AUSTRALIAN LEPIDOPTERA.

By E. MEYRICK, B.A., F.E.S.

III.

The families which form the subject of the present instalment are the *Hepialidae*, which must be regarded as the ancestral family of the *Bombycina*, and the *Monocteniadae*, the most characteristically Australian family of the *Geometrina*.

HEPIALIDAE.

Ocelli absent. Tongue generally obsolete. No maxillary palpi. Antennæ not more than half forewings. Tibiæ without spurs. Forewings with all main veins and costa connected by cross bars near base, 1 furcate towards base (furcation appearing as a parallel vein connected by terminal bar), 9 and 10 stalked, 11 from near base, forked parting-vein well-defined. Hindwings without frenulum; 1c present; neuration essentially identical with forewings.

This curious family is sharply defined and easily recognised by the peculiar type of neuration, which is practically identical in the forewings and hindwings. I regard it as clearly established that this character, now exceptional in the *Lepidoptera*, is ancestral. In the development of the order a tendency to reduction in size of the hindwings, and simplification of their neuration, was very early manifested; with the result that in almost all other families the normal number of veins in the hindwings is less by four than in the forewings. The basal cross bars are also an original character, very early lost. I have explained elsewhere (Trans. N.Z. Inst. 1885, 180) that these characters indicate the origin of

the Lepidoptera from the Trichoptera, and in the case of Tineina the transitional steps are all preserved. It seems to me an inevitable conclusion that the Bombycina originate by a parallel line of development through the Hepialidae from the same source; but at present, so far as my material enables me to judge, the transitional forms on both sides of the Hepialidae are missing, so that the family stands isolated. In this respect the Australian forms, though interesting, add nothing to our knowledge, and do not help to diminish the gaps.

The species are often extremely variable, and the descriptions are therefore necessarily made loose. The larvæ feed either in the stems of trees and shrubs, or beneath the ground on roots. The family is of universal distribution, but nowhere represented by any large number of species; probably the Australian species are more numerous than those of any similar region. In New Zealand there are nine species, all endemic, but belonging entirely to two Australian genera, *Porina* and *Hepialus*. The following is a tabulation of the eight Australian genera.

Forewings with vein 8 out of 10		2.
Forewings with vein 8 not out of 10		3.
Forewings with vein 11 out of 10	1.	Perissect is.
Forewings with vein 11 separate	2.	Porina.
Forewings with veins 7 and 8 stalked	4.	Hectomanes.
Forewings with veins 7 and 8 not stalked		4.
Antennæ subclavate	3.	On coptera.
Antennæ not subclavate		5.
Antennæ in & tripectinated	8.	Trictena.
Antennæ in 3 not tripectinated		6.
Antennæ in & unipectinated	7.	Pielus.
Antennæ in 3 not unipectinated		7.
Hindwings in 3 partially tufted with long		
rough hairs	6.	Leto.
Hindwings in 3 not partially tufted with long		
rough hairs	5.	Hepialus.
	Forewings with vein 8 not out of 10	Forewings with vein 8 not out of 10

1. Perissectis, n.g.

Antennæ ½%, in ♂ stout, joints incised, simple. Palpi moderate, straight, porrected, basal and second joints clothed with dense rough projecting scales, terminal joint moderate, smooth, cylindrical. Posterior tibiæ densely rough-haired. Forewings with vein 7 from angle, 8 and 9 out of 10, 11 out of 10 above 8. Hindwings as in forewings.

Endemic; a special development of Porina.

1. Per. australasiae, Don.

(Hepialus australasiae, Don. Ins. New Holl., Walk. Bomb. 1558; Elhamma inconclusa, Walk. Bomb. 1562; Pielus invarius, Walk. Suppl. 599.)

3. 37-42 mm., Q. 52-85 mm. Head and thorax ochreous or brownish, often reddish-tinged. Antennæ light ferruginous. Abdomen light ochreous, reddish-tinged. Forewings elongate, subtriangular, costa slightly arched, apex rectangular, hindmargin obliquely rounded continuously with inner margin, in Q wing much more elongate and hindmargin more oblique; ochreous, more or less rosy-tinged, especially in Q, thinly sprinkled with dark fuscous, and generally suffusedly spotted and marbled throughout with cloudy fuscous, more distinctly in G; usually more or less distinct darker fuscous irregular band from $\frac{1}{3}$ of inner margin to apex, sometimes quite obsolete: cilia whitish-ochreous, base fuscous, barred with dark fuscous. Hindwings in G yellow-ochreous, slightly rosy-tinged, sometimes more or less infuscated except towards base; in Q pale ochreous-rosy, apex more ochreous.

Sydney and Blackheath (3500 feet), New South Wales; Melbourne, Victoria; from February to April, common.

2. Porina, Walk.

Antennæ 1-2, in δ bipectinated or more or less shortly bidentate. Palpi moderate, porrected, basal joint rough-haired, second joint rough-haired or almost smooth, terminal joint smooth, sometimes

subclavate. Posterior tibiæ densely rough-haired. Forewings with vein 7 from angle, 8 and 9 out of 10, rising much before angle. Hindwings as in forewings.

Easily known by the neuration; the antennal characters vary specifically in the 3, and all gradations can be found from strong pectinations to extremely short hardly noticeable dentations; they are very serviceable for specific distinction, but afford no practible basis for generic separation. The genus is characteristic of Australia and New Zealand, but I have also seen a species from South Africa.

50	Allica.		
1.	Forewings with conspicuous blackish spot above inner margin		sphragidias.
	spot above inner margin		2.
2.	Hindwings red towards base	6.	rufescens.
	Hindwings not red towards base		3.
3.	Antennal pectinations of 3 5	2.	fuscomaculata.
	Antennal pectinations of 3 not over 3		4.
4.	Antennal pectinations of 3		5.
	Antennal pectinations of 3 1-1\frac{1}{2}		7.
5.	Forewings with numerous white spots		6.
	Forewings with discal white mark only	5.	determinata.
6.	Forewings with two posterior series of white		
	spots	7.	niphadias.
	Forewings with more than two posterior		
	series of white spots	3.	australis.
7.	Forewings with silvery-white discal spots	4.	dirempta.
	Forewings without silvery-white discal spots		

2. Por. fuscomaculata, Walk.

(Oxycanus fuscomaculatus, Walk. Bomb. 1574; O. pardalinus, Walk. Suppl. 598.)

3Q. 65-73 mm. Head and thorax dark fuscous or ochreousbrown. Antennæ yellowish-ochreous, pectinations 5. Abdomen

yellowish-ochreous, more or less suffused with fuscous. Forewings rather elongate-triangular, costa posteriorly gently arched, apex obtuse, hindmargin oblique, gently rounded continuously with inner margin; ochreous-brown or dark brown, sometimes lighter in disc, often irrorated with ochreous-whitish; five or six tolerably parallel curved transverse series of small triangular or trapezoidal dark fuscous spots, sometimes centred with ochreous; rarely a cloudy suffused white longitudinal streak in disc; a hindmarginal series of small dark fuscous spots: cilia fuscous or ochreous. Hindwings yellow-ochreous, more or less suffused with fuscous posteriorly; sometimes a faint posterior series of small fuscous spots; cilia brownish-ochreous.

Melbourne, Victoria; Launceston, Tasmania; Adelaide, South Australia; twelve specimens. The longer antennal pectinations (5) will distinguish this at once from all others.

3. Por. australis, Walk.

(Oxycanus australis, Walk. Bomb. 1574; Pielus maculosus, Feld. pl. LXXXI. 1.)

3. 68-84 mm. Head and thorax fuscous. Antennal pectinations 3. Forewings ochreous-fuscous; numerous irregular small silvery-white dark-margined spots, larger and more irregular anteriorly, posteriorly arranged in three transverse series: cilia fuscous. Hindwings ochreous, fuscous-tinged.

Tasmania; five specimens.

4. Por. dirempta, Walk.

(Porina dirempta, Walk. Suppl. 597.)

3. 68 mm. Head and thorax rather dark fuscous. Antennal pectinations 1½, terminating in tufts of cilia. Abdomen yellow-ochreous. Forewings fuscous, becoming ochreous in disc anteriorly; anterior half of costa suffused with dark fuscous; a whitish longitudinal streak in disc from base, suffused on posterior half into a broad fuscous-whitish cloud extending to anal angle;

two small triangular silvery-whitish dark-margined spots on upper margin of this before middle; two or three partial series of small white dark-margined spots towards costa posteriorly. Hindwings yellow-ochreous.

South Australia; one specimen (Brit. Mus. Coll.). Probably this species may vary much in markings, and the form described has hardly the appearance of being typical, but the antennal characters are sufficient to distinguish it.

5. Por. determinata, Walk.

(Elhamma determinata, Walk. Bomb. 1563.)

3. 58 mm. Head and thorax rather dark ochreous-fuscous. Antennal pectinations 3 (obscured through mould). Forewings ochreous-fuscous, with several obscure transverse series of subconfluent darker spots; an oblique transverse silvery-white mark, appearing to be composed of three small confluent spots, in middle of disc, preceded and followed by a darker fuscous suffusion. Hindwings ochreous-fuscous.

West Australia (?); one specimen (Brit. Mus. Coll.).

6. Por. rufescens, Walk.

(Oxycanus rufescens, Walk. Bomb. 1575.)

3. 60 mm. Head and thorax rather dark fuscous. Antennal pectinations 2½. Abdomen suffused with red towards base. Forewings fuscous; two or three anterior dark fuscous dots in disc, and two posterior series of fuscous dots, all surrounded by ochreous rings; two silvery-white dark-margined adjacent dots in centre of disc. Hindwings dull fuscous-ochreous, towards base suffused with red.

Tasmania; one specimen (Brit. Mus. Coll.).

7. Por. niphadias, n.sp.

3. 47 mm. Head dark fuscous. Antennæ yellow-ochreous, pectinations 3. Thorax ochreous-fuscous, anteriorly darker. Abdomen light brownish-ochreous. Forewings elongate, sub-

triangular, costa sinuate, posteriorly moderately arched, apex rounded, hindmargin obliquely rounded continuously with inner margin; fuscous, darker towards base of costa; two cloudy whitish spots obliquely placed in disc at $\frac{1}{3}$, and an irregular short longitudinal whitish mark in middle of disc; two nearly straight transverse series of subtriangular subconfluent whitish spots, not reaching either margin, first at $\frac{2}{3}$, second at $\frac{5}{6}$: cilia rather dark fuscous. Hindwings pale ochreous-fuscous, becoming more yellowish-ochreous towards base; cilia rather dark fuscous.

Mount Lofty, South Australia; one specimen received from Mr. E. Guest.

8. Por. subvaria, Walk.

(Elhamma subvaria, Walk. Bomb. 1562; Oxycanus subvarius, ib. 1575.)

3.41-55 mm. Head and thorax dark ochreous-fuscous. Antennal pectinations 1. Forewings ochreous-fuscous; two or three small scattered fuscous sometimes pale-centred spots in disc, and two posterior series of similar spots; a hindmarginal series of small fuscous spots: cilia ochreous or fuscous. Hindwings light ochreous-fuscous, sometimes with two posterior series of small fuscous spots.

Tasmania; three specimens (Brit. Mus. Coll.). The species has shorter antennal pectinations than in any other Australian form, excepting the following. There can be no doubt that Walker's two descriptions quoted above are actually drawn from the same specimens, though he appears in his catalogue to place them as a distinct species.

9. Por. sphragidias, n.sp.

3. 56 mm. Head and thorax ochreous-brown. Antennæ light ferruginous, shortly dentate. Abdomen fuscous, apex deep ochreous. Forewings elongate-oblong, posteriorly hardly dilated, costa gently arched, apex obtuse, hindmargin obliquely rounded continuously with inner margin; deep yellow-ochreous, irregularly irrorated with ochreous-brown and dark fuscous; the absence of irroration

forms three series of moderate irregular subconfluent spots, first about $\frac{1}{4}$, strongly curved, second about middle, nearly obsolete on lower half, third about $\frac{3}{4}$, slightly curved; an ill-defined dark fuscous irregular cloudy longitudinal streak in disc from base to near hindmargin; a conspicuous subtriangular blackish-fuscous spot above inner margin at $\frac{1}{3}$; a smaller transverse-oval ochreouswhite spot near beyond this: cilia yellow-ochreous, tips paler, sharply barred with dark fuscous. Hindwings rather dark fuscous; costa, a hindmarginal line, and veins posteriorly suffused with bright deep yellow-ochreous; cilia as in forewings.

Tasmania (?); two specimens received from Mr. A. Simson.

3. ONCOPTERA, Walk.

Antennæ $\frac{1}{6}$, gradually swollen towards apex so as to appear subclavate, simple, basal joint with a tuft of hairs projecting over eye. Palpi moderate, straight, porrected, slender, wholly clothed with long rough projecting hairs. All tibiæ densely rough-scaled; posterior tibiæ in \Im with a very large broad curved tuft of very long hairs rising from above near base, and lying along abdomen. Forewings with vein 7 from angle, 8 from near before angle, 9 and 10 stalked. Hindwings as in forewings.

A curious form, differing from all others in the antennæ. Walker writes the generic name *Oncopera*, quoting it as a MS. name of Stephens, who evidently intended the orthographically correct name which I have restored above.

10. Onc. intricata, Walk.

(Oncopera intricata, Walk. Bomb. 1559.)

3. 31-41 mm., Q. 48 mm. Head, antennæ, thorax, and abdomen fuscous or ochreous-fuscous. Forewings suboblong, posteriorly somewhat dilated, costa slightly arched, apex rounded, hindmargin obliquely rounded continuously with inner margin; ochreous, ochreous-brown, or dark fuscous; generally more or less distinctly marbled with irregular paler or whitish markings, including rounded darker spots sometimes marked with blackish, but these

markings are sometimes wholly confused or obsolete; a pale oblique mark from inner margin near base, margined on each side with blackish, is generally conspicuous but sometimes obsolete: cilia with basal half ochreous-brown, terminal half white, sharply barred with dark fuscous. Hindwings rather dark fuscous; costa in 3 suffused with whitish-ochreous or yellow-ochreous; cilia as in forewings.

Melbourne and Warragul, Victoria; Deloraine and Hobart, Tasmania; from October to December, common. A very variable species.

4. HECTOMANES, n.g.

Antennæ $\frac{1}{5}$, in \Im shortly bipectinated throughout. Tongue present, short. Palpi very short, clothed with long rough projecting hairs. All tibiæ and anterior tarsi clothed with dense rough hairs. Forewings with veins 7 and 8 stalked from angle, 9 and 10 stalked from near before angle, 11 from before middle. Hindwings as in forewings, but veins 7 and 8 sometimes from a point.

Differs from all in the structure of veins 7 and 8. Walker has applied the generic name Frais to a species of this genus, but upon investigation it appears (1) that he adopted it as a MS. name of Stephens, (2) that he misread it, Stephens having apparently intended to write Praus, and (3) that this name (Gk. $\pi\rho a\acute{v}s$) ought to be written Prays, and it is therefore already preoccupied by Curtis for a genus of Lepidoptera; I have accordingly rejected Walker's name.

1.	Forewings reddish-ochreous	12.	simulans 5.
	Forewings fuscous		2.
2.	Forewings with strong white streak from base		
	to apex	12.	simulans Q.
	For ewings with streak incomplete or absent		3.
3.	Cilia fuscous	11.	noserodes.

Cilia whitish-ochreous, barred with fuscous... 13. polyspila.

11. Hect. noserodes, n.sp.

30-35 mm. Head and thorax fuscous or dark fuscous. Antennæ and abdomen fuscous. Forewings elongate-oblong, posteriorly somewhat dilated, costa gently arched, apex rounded, hindmargin very obliquely rounded continuously with inner margin; fuscous or whitish-fuscous; numerous darker fuscous dots, tending to be arranged in longitudinal and transverse series, sometimes surrounded with fuscous-whitish rings; sometimes a straight very slender fuscous-whitish longitudinal streak from base to $\frac{9}{3}$, suffusedly margined above with dark fuscous, sometimes obsolete: cilia fuscous. Hindwings fuscous or whitish-fuscous.

Sydney, New South Wales; three specimens, in May.

12. Hect. simulans, Walk.

(Fraus simulans, Walk. Bomb. 1564; F. bilineata, ib. Suppl. 595).

- ¿7. 22-25 mm. Head, antennæ, thorax and abdomen deep reddish-ochreous. Forewings suboblong, posteriorly somewhat dilated, costa faintly sinuate, apex rounded, hindmargin obliquely rounded continuously with inner margin; deep reddish-ochreous or ferruginous; a slender somewhat irregular straight white longitudinal streak in disc from ½ to about ½ sometimes wholly absent; traces of fuscous dots posteriorly: cilia reddish-ochreous. Hindwings rather dark fuscous; cilia reddish-ochreous; more or less mixed with dark fuscous.
- Q. 32-36 mm. Head, antennæ, thorax, and abdomen fuscous. Forewings much more elongate and hindmargin more oblique than in \Im ; fuscous, veins indistinctly streaked with reddish-ochreous; costal edge whitish-ochreous from near base to near apex; a moderate straight silvery-white longitudinal streak in disc from base, near hindmargin bent upwards to terminate in apex, on posterior half margined beneath with light ochreous-reddish; beneath this a series of obscure silvery-whitish short longitudinal streaks between veins before hindmargin, becoming larger down-

wards, terminating in a slender silvery-whitish streak along hind-margin: cilia whitish-fuscous, with a basal reddish-ochreous line. Hindwings fuscous-grey.

Sydney and Blackheath (3500 feet), New South Wales; Warragul, Victoria; Tasmania; March to May, common.

13. Hect. polyspila, n.sp.

 \mathfrak{F} . 31 mm. Head, antennæ, and thorax ochreous-fuscous. Abdomen light brownish-ochreous. Forewings elongate-triangular, costa sinuate, apex rounded, hindmargin obliquely rounded continuously with inner margin; fuscous; veins and a broad costal streak pale ochreous; costal edge dark fuscous on basal $\frac{2}{3}$; fuscous portion strewn with numerous irregular suboval moderate whitish spots: cilia whitish-ochreous, slenderly barred with fuscous. Hindwings pale fuscous; costa and veins towards costa posteriorly ochreous; cilia as in forewings.

Wimmera, Victoria; one specimen.

5. HEPIALUS, F.

Antennæ $\frac{1}{4}$ - $\frac{1}{8}$, in \mathcal{J} simple. Palpi short or moderate, porrected, with rough projecting hairs, terminal joint naked, subclavate. Posterior tibiæ densely rough-haired, sometimes with long projecting tuft above in \mathcal{J} . Forewings with vein 7 from angle, 8 from much before angle, 9 and 10 stalked from near 8. Hindwings as in forewings.

The Australian species of this genus, which are all more or less green, have generally been regarded as a distinct genus, under the name of *Charagia*, but I am unable to discover any structural difference from ordinary forms of the northern hemisphere, where the genus is mainly resident. I cannot therefore separate them generically, but they form an interesting subgroup. The larvæ of the Australian species feed in tunnels in the stems of trees or shrubs, eating by preference the bark round the mouth of the tunnel, and concealing themselves meanwhile under a broad

shelter of silk and refuse. The perfect insects are very retired in habit, and are rarely obtained except by breeding the larvæ. The notes on larvæ following are taken from Scott.

If the name *Hepialus* is derived from the Greek $\eta_{\pi,\alpha\lambda os}$, it should of course be written without the aspirate; but it appears to me that this derivation is very doubtful, and that without more certainty it is undesirable to vary the usually adopted form.

1. Forewings purple or fuscous-reddish,
with green markings
Forewings green, with white or brown markings 4.
markings
2. Forewings anteriorly with a triangular green blotch
Forewings anteriorly with a sinuate
green longitudinal band 14. Lewinii Q.
3. Forewings with subapical blotch con-
nected with anterior blotch 15. lignivorus Q.
Forewings with subapical blotch
separate 16. splendens Q.
4. Hindwings yellow or red 5.
Hindwings white or green 8.
5. Forewings with markings brown 17. Scotti Q
Forewings with markings silvery-white 6.
6. Forewings with inner margin suffused
with red 20. argyrographus Q
Forewings with inner margin not
suffused with red
7. Hindwings with apex greenish 19. scriptus Q.
Hindwings with apex not greenish 18. Ramsayi Q.
8. Forewings with white costal streak 9.
Forewings without white costal streak 11.
9. Forewings with three white fasciæ 16. splendens 3.
Forewings with one white fascia 10.

10. Forewings with two white streaks from	
inner margin before middle	14. Lewinii 3.
Forewings with one white streak from	
inner margin before middle	15. lignivorus 3.
11. Forewings with a posterior golden	
fascia	21. eximius 3.
Forewings without a posterior golden	
fascia	12.
12. Forewings with one posterior white	
fascia	18. Ramsayi 3.
Forewings with four posterior white	
fasciæ	19. scriptus 3.

14. Hep. Lewinii, Walk.

(Charagia Lewinii, Walk. Bomb. 1570; Scott, Trans. Ent. Soc. N.S. Wales, II. 30; C. Lamberti, Walk. Bomb. 1571.)

- \Im . 44 mm. Head and thorax green. Forewings green; markings silvery-white; a streak along costa from base to $\frac{3}{4}$; a slender nearly perpendicular streak from inner margin at $\frac{1}{5}$, reaching half across wing; a similar streak near beyond it, from apex of which proceeds a streak (forming an acute angle with it) to $\frac{2}{3}$ of inner margin, where it meets a straight slender transverse streak from $\frac{3}{4}$ of costa. Hindwings greenish-whitish.
- Q. 58 mm. Head and thorax dark fuscous-red. Forewings fuscous-reddish; a rather broad irregular green band from disc near base to near inner margin in middle, where it forms an acute angle, thence bent up to beneath costa at 3; a small green spot towards hindmargin in middle, sometimes connected with this band. Hindwings ochreous-rosy.

Sydney, New South Wales; rather common. Larva on Casuarina and other trees.

15. Hep. lignivorus, Lw.

(Hepialus lignivora, Lw. Ins. N. S. Wales, pl. 16; Charagia lignivora, Scott, Austr. Lep. 5, pl. ii. Trans. Ent. Soc. N. S. Wales, II. 29.)

- $\[\]$. 40-48 mm. Head whitish. Antennæ reddish ochreous. Thorax green, anterior margin and posterior crest white. Forewings elongate-triangular, costa sinuate, posterior moderately arched, apex round-pointed, hindmargin oblique, rather strongly sinuate inwards on upper half, rounded beneath tolerably continuously with inner margin; green; a white streak along costa from base to $\frac{3}{4}$, broad at base, attenuated throughout; a white outwardly oblique streak from inner margin at $\frac{1}{5}$, reaching half across wing; a white inwardly oblique streak from inner margin beyond middle, its apex almost or quite touching apex of preceding streak; a slender somewhat sinuate white fascia from $\frac{3}{4}$ of costa to $\frac{3}{4}$ of inner margin, where it is sometimes confluent with preceding streak. Hindwings white.
- Q. 50-66 mm. Head, antennæ, and thorax rather dark fuscous. Forewings rather dark fuscous, somewhat mixed with reddish; markings bright green; a very large triangular blotch in disc anteriorly, its angles lying beneath costa near base, beneath costa at $\frac{2}{3}$, and very near inner margin beyond middle; sometimes one or two small spots near inner margin before middle; an irregular suboblong blotch along hindmargin from apex to below middle, connected with anterior blotch by a bar in disc. Hindwings ochreous-rosy, more ochreous posteriorly; hindmargin narrowly suffused with dark fuscous from below middle to middle of inner margin.

Newcastle and Sydney, New South Wales; Fernshaw, Victoria; Hobart, Tasmania; Mount Lofty, South Australia; common. Larva on various trees and shrubs.

16. Hep. splendens, Scott.

(Charagia splendens, Scott, Trans. Ent. Soc. N. S. Wales, II. 31.)

 \mathcal{J} . 60 mm. Forewings yellowish-green, posteriorly bluish-green; markings silvery-white; a streak along costa from base to $\frac{2}{3}$, thence to inner margin beyond middle, thence towards base, before reaching which it forms two distinct angles; two narrow

posterior transverse fasciae, connected at upper extremity; a bluish-green V-shaped mark in centre of disc. Hindwings greenish-white.

Q. 80 mm. Forewings purple; markings green; a large triangular discal blotch, lower angle touching inner margin, upper side thrice indented towards base; a blotch towards apex, extending half across wing, indented on anterior side; a spot near anal angle, and two near base. Hindwings pale purplish-red.

Sydney, New South Wales. Larva on *Casuarina* and other trees. I have not seen this species, and have drawn up the description from Scott's.

17. Hep. Scotti, Scott.

(Charagia Scotti, Scott, Trans. Ent. Soc. N. S. Wales, II. 34.)

Q. 112 mm. Forewings green, strewn with small purplish-brown spots; a slender purplish-brown posterior fascia. Hindwings yellowish-red.

Richmond River, New South Wales. Larva on Wistaria, &c. The above is taken from Scott's description.

18. Hep. Ramsayi, Scott.

(Charagia Ramsayi, Scott, Trans. Ent. Soc. N. S. Wales, II. 32.)

- 3. 84-100 mm. Head and thorax green. Forewings green; markings silvery-white, sometimes reddish-tinged, fuscous-margined; four small spots on anterior half of costa, one towards base in middle, one on inner margin near base, one below disc at $\frac{1}{3}$, and a transverse series of four transverse narrow spots, bisected by veins, at $\frac{2}{3}$; one or two small spots on hind-margin. Hindwings whitish-green.
- Q. 137 mm. Forewings green; markings silvery-white, margined with dark fuscous, placed as in \eth but larger. Hindwings yellowish-red.

Newcastle, New South Wales. Larva on Acmena, &c.

19. Hep. scriptus, Scott.

(Charagia scripta, Scott, Trans. Ent. Soc. N.S. Wales, II. 33.)

- 3. 75 mm. Forewings green, posteriorly yellowish-tinged, watered with paler; four posterior silvery-white fasciæ; anterior half strewn with short silvery-white marks. Hindwings greenish-white.
- Q. 100 mm. Forewings green, watered with paler; costa strigulated with silvery-white; a discal silvery-white spot; two posterior series of silvery-white spots. Hindwings yellowish-red, tips greenish.

Albany, West Australia. I have not seen it; description taken from Scott's.

20. Hep. argyrographus, Feld.

(Charagia argyrographa, Feld. pl. LXXXI. 2.)

Q. 84 mm. Forewings green, towards inner margin suffused with reddish; costa spotted with dark grey and whitish; numerous small scattered paler marks; two posterior series of white spots, and a hindmarginal series. Hindwings deep ochreous-yellow, suffused with reddish towards base.

No special locality quoted. I have not seen the species, and have described Felder's figure.

21. Hep. eximius, Scott.

(Charagia eximia, Scott, Trans. Ent. Soc. N.S. Wales, II. 35.)

3. 75-110 mm. (?) Forewings green, watered with numerous short silvery-white marks; a posterior golden fascia not reaching either margin. Hindwings pale blue-green.

Newcastle, New South Wales. Larva on *Dodonaea angustifolia*. Unknown to me; description from Scott.

6. Lето, Hb.

Antennæ $\frac{1}{10}$, in \Im simple. Palpi moderate, porrected, smooth-scaled. Forewings with vein 7 from angle, 8 from before angle, 9 and 10 stalked. Hindwings in \Im with upper surface partially tufted with long rough hairs; neuration as in forewings.

Besides the following, there is one South African species, of almost equal size and splendour. There is no doubt of the generic identity of these two forms, which agree in all structural characters, and are specially distinguished by the shaggy tufts of the hindwings in the \mathcal{S} , being at the same time the largest and most magnificent of the family. The instance of near affinity between Australian and South African forms in the Lepidoptera are by no means numerous, and this is an interesting case.

22. Let. Stacyi, Scott.

(Zelotypia Stacyi, Scott, Trans. Ent. Soc. N.S. Wales, II. 38.)

♂Q. 175-220 mm. Forewings greenish-ochreous; costal area strewn with ferruginous spots, surrounded by ochreous-whitish rings; hindmarginal area watered with ferruginous and whitish lines; some small black spots on costa towards apex and on hindmargin; a large raised roundish deep ochreous spot beyond middle, containing a central black crescentic mark, and a round pale ochreous white-circled anterior spot; in ♂ two or three cloudy whitish blotches on costa, one in disc before middle, and a narrow irregular fascia at ¾. Hindwings deep ferruginous-orange.

Newcastle and Manning River, New South Wales. The larva feeds in the trunks of trees. It seems to me not improbable that the colouring of the perfect insect is designed to imitate the head of a snake; this might be determined by those who have the opportunity of seeing the insect alive in its natural position of repose.

7. Pielus, Walk.

Antennæ $\frac{1}{4}$, in \mathcal{J} unipectinated throughout, pectinations broad, lamellate. Palpi short, basal joint somewhat rough-scaled beneath, second and terminal joints smooth, terminal joint nearly as long as second, subclavate. Posterior tibiæ with long rough projecting hairs. Forewings with vein 7 from angle, 8 from much before angle, 9 and 10 stalked from near 8. Hindwings as in forewings.

23. Piel. ingens, Walk.

(Charagia ingens, Walk. Suppl. 596; Pielus erythrinus, ib. 599.)

3. 137-156 mm. Head, thorax, and abdomen pale brownishochreous; abdomen sometimes suffused with very pale rosy except
towards apex. Antennæ dark fuscous, pectinations 1½. Forewings elongate, subtriangular, costa gently arched, apex obtuse,
hindmargin extremely obliquely rounded continuously with inner
margin, not sinuate; unicolorous pale brownish-ochreous or
ochreous-reddish. Hindwings pale brownish-ochreous or yellowish-ochreous, towards base sometimes suffused with very pale
rosy.

Fernshaw, Victoria; four specimens. This species has been alleged to occur in New Zealand, but I believe by a simple error.

24. Piel. hyalinatus, HS.

(Hepialus hyalinatus, HS. Lep. Exot. I. 50; Pielus hyalinatus, Walk. Bomb. 1576; P. tasmaniæ, ib. 1577; Rhizopsyche Swainsoni, Scott, Austr. Lep. 11. pl. IV.; Pielus imperialis, Olliff, Proc. Linn. Soc. N.S. Wales, 1887, 1015, pl. xxxix.)

30. 80-165. Head and thorax brown, sometimes reddish or ochreous-tinged, crown and posterior part of thorax sometimes suffused with whitish-ochreous. Antennæ dark fuscous, pectinations 2. Forewings elongate, subtriangular, costa gently arched, apex obtuse, hindmargin very oblique, gently rounded continuously with inner margin; brown or light brownish-ochreous, irregularly marked with parallel labyrinthine paler or whitish lines, alternating with dark fuscous or blackish, tending to enclose irregular darker sometimes whitish-centred spots, especially in disc between discal and posterior streaks, very variable, sometimes more or less wholly obsolete; a very irregular rather broad white longitudinal streak in disc from near base to 2, sometimes hardly paler than ground colour, sometimes variously interrupted, or extended to connect with posterior streak; a similar oblique streak from apex to above anal angle, similarly very variable: cilia rather dark fuscous. Hindwings pale grey, light brownish-ochreous, fuscous, or dark grey, base sometimes considerably darker.

var. a. Base of hindwings and of abdomen rosy.

var. β . Forewings and hindwings rosy-ochreous; streaks silverywhite, broadly margined with fuscous; labyrinthine marks obsolete.

Newcastle and Blackheath, New South Wales; Melbourne, Warragul, and Fernshaw, Victoria; fifteen specimens. The larva feeds underground on the roots of trees. The imago is exceedingly variable, no two being alike.

8. TRICTENA, n.g.

Antenne $\frac{1}{3}$, in \mathcal{J} tripectinated throughout. Palpi moderate, straight, porrected, basal joint shortly rough-scaled beneath, second and third terminal joints smooth, terminal joint half second, clavate. Posterior tibiæ densely rough-haired. Forewings with vein 7 from angle, 8 from much before angle, 9 and 10 stalked from near 8. Hindwings as in forewings.

Characterised by the singular tripectinate antennæ, which are, so far as I know, unique. The imago is of ponderous build; it may be regarded as a development of the preceding genus.

25. Trict. labyrinthica, Don.

(Cossus labyrinthicus, Don. Ins. N. Holl.; C. argenteus, ib., HS. Lep. Exot. I. 47, 48; Pielus labyrinthicus, Walk. Bomb. 1578; P. atripalpis, ib. 1577; P. hydrographus, Feld. pl. LXXX. 3.)

32. 100-188 mm. Head, thorax, and abdomen dark fuscous. Antennæ light ferruginous. Forewings elongate-triangular, costa posteriorly moderately arched, apex obtuse, hindmargin oblique, slightly sinuate, rounded beneath continuously with inner margin; dark fuscous, more or less marked with irregular parallel lighter and darker labyrinthine lines, tending to enclose irregular concentric rings, especially towards hindmargin, where they are sometimes whitish-centered; a very irregular-edged rather broad white longitudinal streak in disc from near base to before $\frac{2}{3}$, posteriorly generally emitting three or four short teeth; sometimes several small scattered white spots in disc beyond apex of this; a slightly

sinuate rather irregular white streak from apex, or close beneath it, to midway between apex of discal streak and anal angle, more or less dilated in middle, lower portion sometimes interrupted to form two or three spots; in Q all white markings are much reduced or entirely absent: cilia dark fuscous. Hindwings fuscous; cilia dark fuscous.

Sydney, New South Wales; in April and May, sometimes common at gas-lamps. Larva subterranean, feeding on the roots of trees, sometimes at a considerable depth; it was eaten for food by the natives.

MONOCTENIADAE.

No maxillary palpi. Forewings with vein 1 simple, 5 rising from transverse vein not nearer to 4 than to 6, 7 and 8 out of 9. Hindwings with vein 1c absent; 5 from middle of transverse vein, 8 closely approximated to upper margin of cell from near base to middle of cell or beyond, rarely fused with it at a point near base, or (Hypographa) anastomosing with margin of cell.

This family I have elsewhere called Oenochromidae, but as the genus Oenochroma proves on examination to be non-existent, being only a synonym of Monoctenia, I consider it necessary to change the name accordingly. The family belongs to the Geometrina, and is of great interest as being apparently the most ancestral section of that group. With the Larentiadae and Boarmiadae it cannot be confused structurally (see however Hypographa); with the Geometridae and Desmobathridae also no difficulty can arise except in the case of those exceptional genera in which vein 8 of the hindwings is fused with the cell at a point near base; from these the Geometridae differ in that vein 8 after fusion immediately diverges rapidly from the cell, whilst in the Monocteniadae it continues close to it and approximately parallel; in the Desmobathridae vein 8 is not fused with the cell-margin but connected with it by a well-marked and distinct bar, but no doubt the genetic relation here runs close, the two families being really united developmentally through these very genera or others nearly related. The Larentiadae are without doubt derived directly from the Monocteniadae, originating from a type closely resembling Dichromodes, by strong anastomosis of vein 8 in the hindwings with the cell-margin. The Desmobathridae may also be certainly regarded as springing from a form nearly allied to Xenomusa. The Geometridae and Boarmiadae appear to me at present to be derived from a common ancestor approaching Aspilates, but the actual line of connection is not yet quite clearly made out.

Within the limits of the family there is considerable variation in superficial characteristics, some of the earlier genera being very Bombyciform in appearance. An interesting structural character which is very common in this family and very unusual in any other is found in the uniserial pectinations of the antennæ; nearly three-fourths of the species of *Monocteniadae*, including the most dissimilar groups, show this character, which appears elsewhere in the *Lepidoptera* only in isolated instances. The larvæ are at present little known; but some, at least, have twelve perfect legs instead of ten, and moreover possess rudiments of the other two pairs; this is what one might expect in an ancestral group, and it would not surprise me if larvæ of this family were hereafter found with the full complement of sixteen perfect legs.

The geographical distribution of the family shows very markedly the usual features of an ancient group, struggling with difficulty to maintain itself against numerous newer and improved forms. There are a certain number of small, scattered, and fragmentary genera, occurring almost at random throughout the old world, and nowhere dominant; and there is also a specially developed later group (that of Taxeotis and Dichromodes) practically confined to Australia, originating there under the protection of a situation which probably long excluded dangerous competitors, and hence much better represented in number of species. I conceive that the immediate ancestors of the Dichromodes group, residing probably in Southern Asia, gave rise to two separate branches of descent, one being the Dichromodes group, which arose within Australia from emigrants who made their way thither; and the

other the *Larentiadae*, which rapidly became a dominant type in Asia and Europe and spread thence over all the world, making their way also to Australia at a later period; here they have flourished as elsewhere, but the *Dichromodes* group found itself already so well established and adapted to its situation, that it has apparently not suffered much from their competition, though not strong enough to retaliate by invading the enemy's country, except that it has contrived to settle a very small colony in the mountains of New Zealand. I think this is a clear and interesting case.

In the following tabulation of genera I have included not only the Australian genera, but all those from other regions with which I am acquainted by actual observations, as it will help to give an idea of the range of the family, which has been hitherto unrecognised. Brephos, for example, has been usually classed with the Noctuina (though Lederer showed that it could not remain there and constituted a separate family for it), and the others have been distributed at random in various groups. The Australian genera are numbered in succession; the others are distinguished by letters attached to the number of the genus immediately preceding them, which serve to show their position in sequence.

1. I	Hindwings with vein 8 fused with cell at a	
	point near base	2.
Ε	Hindwings with vein 8 free or rarely anas-	
	tomosing with cell strongly	3.
2. F	Face and palpi clothed with very long rough	
	hairs	Brephos.
F	'ace and palpi not hairy10.	Xenomusa.
3. A	Antennæ in & pectinated	4.
A	Antennæ in & ciliated	17.
4. A	Antennæ in & unipectinated	5.
A	Antennæ in & bipectinated	9.
5. F	Corewings with vein 10 out of 9 4.	Satraparchis.
	orewings with vein 10 rising separate	6.

BY E. MEYRICK.

6.	Forewings with vein 11 anastomosing with 1216.	Hypographa,
	Forewings with vein 11 not anastomosing with 12	7.
7.	Forewings with vein 11 anastomosing with 10	Epidesmia.
	Forewings with vein 11 free	8.
8.	Tarsi spinulose	Monoctenia.
	Tarsi not spinulose 6.	Dichromodes.
9.	Forewings with vein 11 connected with 12	11.
	Forewings with vein 11 not connected with	
	12	10.
10.	Forewings with vein 10 absent7b.	Eremia.
	Forewings with vein 10 present	12.
11.	Forewings with vein 10 anastomosing with 11 2.	Darantasia.
	Forewings with vein 10 free11.	Onychodes.
12.	Forewings with vein 10 anastomosing with 11	13.
	Forewings with vein 10 not anastomosing with 11	14.
13.	Antennal pectinations short, terminating in tufts of long cilia7f.	Theoxena.
	Antennal pectinations normal 3.	Nearcha.
14.	Tarsi spinulose14.	Phallaria.
	Tarsi not spinulose	15.
15.	Posterior tibiæ without middle-spurs12.	Arrhodia.
	Posterior tibiæ with middle-spurs	16.
16.	Forewings with vein 6 out of 913.	Gastrophora.
	Forewings with vein 6 separate 8.	Aspilates.
17.	Antennæ nearly as long as forewings 9.	Eumelia.
	Antennæ normal	18.

18.	Forewings with vein 11 free 7.	Oenone.
	Forewings with vein 11 not free	19.
19.	Hindwings with 6 and 7 stalked	20.
	Hindwings with veins 6 and 7 separate	21.
20.	Forewings with vein 10 absent7c.	Aplasta.
	Forewings with vein 10 present7d.	Odezia.
21.	Forewings with vein 11 out of 107e.	Gypsochroa.
	For ewings with vein 11 separate 1.	Taxeotis.

1. Taxeotis, n.g.

Face smooth. Tongue developed. Antennæ in $\mathfrak F$ filiform or subdentate, moderately ciliated $(\frac{3}{4}\cdot 1)$. Palpi moderate or rather long, porrected, rough-scaled. Forewings with vein 10 anastomosing with 9, 11 anastomosing strongly with 10 before 9, 12 sometimes connected by bar with 11. Hindwings with veins 6 and 7 approximated at base.

An endemic development from *Epidesmia*. The species are commonly very difficult to distinguish, being obscurely coloured, extremely similar, and at the same time variable; I believe however that I have correctly defined the limits of those given, though I make no doubt that there are other closely allied forms which I have overlooked or not met with.

1.	Forewings without discal dot	13. philodora.
	Forewings with discal dot	2.
2.	Forewings with discal dot spot-like, pale-	
	centred	$2.\ stereospila.$
	Forewings with discal dot not spot-like,	
	pale-centred	3.
3.	Forewings with two triangular black spots	
	on costa	4. isomeris.
	Forewings without two triangular black	
	spots on costa	4.

4.	Face ferruginous	5.
	Face dark fuscous (sometimes ferruginous-	0
	tinged) or black	6.
5.	Forewings with first line marked by a	
	ferruginous black-spotted streak	5. exsectaria.
	Forewings with first line obsolete	1. endela.
6.	Forewings with costal edge ochreous-	
	yellowish anteriorly	6. anthracopa.
	Forewings with costal edge not ochreous-	
	yellowish anteriorly	7.
7.	Base of palpi sharply whitish	8.
	Base of palpi not sharply whitish	12.
8	Forewings with second line ferruginous or	
0.	ochreous-tinged	9.
	Forewings with second line not ferruginous	J.
	or ochreous-tinged	10.
0	•	10.
9.	Forewings with a sharply marked dark	W 7.7
	line in cilia	7. delogramma.
	Forewings without a sharply marked dark	0.1
	line in cilia	8. intextata.
10.	Forewings with a subterminal series of	
	darker spots	11.
	Forewings without a subterminal series of	
	darker spots	10. intermixtaria.
11.	Forewings grey	12. isophanes.
	Forewings ochreous-whitish	11. epigypsa.
12	Forewings with hindmargin on upper half	
1	sinuate	9. egenata.
	Forewings with hindmargin on upper half	o. egeniidu.
	straight	3. oraula.
	onengno	o. oraaaa.

In the first three species vein 12 of the forewings is free, in all the others it is connected by bar with 11. This character is constant in my specimens, but is perhaps not altogether reliable, and too much stress should not be laid on it.

1. Tax. endela, n.sp.

\$\frac{1}{2}\cdot 22-28 \text{ mm.}\$ Head ochreous-whitish, face light ferruginous. Palpi 2, light ferruginous, base ochreous-whitish. Antennæ whitish. Thorax, abdomen, and legs pale whitish-ochreous. Forewings triangular, hindmargin straight above, rounded beneath; 12 free; whitish-ochreous, with some fine scattered dark fuscous scales; a dark fuscous dot in disc above middle; a nearly straight or faintly sinuate series of about seven blackish dots from \frac{3}{4} of inner margin towards apex, only reaching \frac{3}{4} across wing, sometimes edged posteriorly by a slender faint ochreous streak; a fine blackish interrupted hindmarginal line or series of dots: cilia whitish-ochreous. Hindwings with hindmargin rounded; whitish-ochreous, generally with fine scattered dark fuscous scales; hindmarginal line and cilia as in forewings.

Bathurst (2500 feet), New South Wales; Melbourne, Victoria; in November and December, four specimens. A distinct species, well characterised by the pale ferruginous face and palpi, whitish-ochreous colouring, total absence of first line of forewings, and straightness of second.

2. Tax. stereospila, n.sp.

 $\Im Q$. 21-24 mm. Head pale whitish-ochreous, face rather dark fuscous except lower margin. Palpi $2\frac{1}{2}$ -3, whitish-ochreous, externally more or less brownish-tinged. Antennæ ochreous-whitish. Thorax whitish-ochreous. Abdomen ochreous-whitish, sprinkled with blackish. Legs whitish-ochreous irrorated with blackish, tarsal joints blackish towards base. Forewings triangular, hindmargin on upper half in \Im almost straight, in \Im sinuate, rounded beneath; 12 free; whitish-ochreous, irrorated with fuscous and black; a small dark fuscous mark on costa at $\frac{1}{3}$, a dot on inner margin at $\frac{1}{3}$, and one or two dots in a straight line between them; a small transverse-oblong fuscous or blackish spot in disc above middle, centred with paler scales; a small dark fuscous mark on costa at $\frac{3}{4}$; a cloudy dark fuscous line from apex to inner margin at $\frac{3}{4}$, sinuate inwards on upper half and again on lower half, on lower $\frac{3}{4}$ closely preceded by a ferruginous sometimes interrupted

line, marked in $\mathfrak Z$ with black dots on veins, and closely followed by a series of cloudy blackish dots; a hindmarginal series of black dots: cilia whitish-ochreous, basal half in $\mathfrak Q$ irrorated with dark fuscous. Hindwings with hindmargin rounded; pale whitish-ochreous, irrorated with fuscous and blackish; a short double dark fuscous line rising from inner margin at $\frac{2}{3}$; hindmarginal dots and cilia as in forewings.

Sydney and Bathurst (2500 feet), New South Wales, in October and November; common. Distinguished from all others by the small dark pale-centered spot replacing the usual discal dot of forewings.

3. Tax. oraula, n.sp.

3. 21-22 mm. Head grey-whitish, face dark fuscous. Palpi 11, dark fuscous. Antennæ grey-whitish. Thorax and abdomen whitish-grey. Legs grey, posterior tibiæ grey-whitish. Forewings triangular, hindmargin straight above, rounded beneath; 12 free; pale grey, sprinkled with dark fuscous; a short dark fuscous mark on costa at 2, one on inner margin at 2, and a dot in disc directly between these; a minute dark fuscous dot in disc above middle; a dark fuscous mark on costa at 3; a series of dark fuscous dots from near beyond lower extremity of this to 3/4 of inner margin, rather strongly sinuate inwards on lower half, the whole sometimes connected by a fine denticulate dark fuscous line, acutely angulated at upper extremity to connect with costal mark; a very faintly indicated paler waved subterminal line; a hindmarginal series of black dots: cilia pale grey. Hindwings with hindmargin rounded; pale grey; a short indistinct dark fuscous erect line from 2 of inner margin; a hindmarginal series of dark fuscous dots; cilia pale grey.

Mount Kosciusko (5000-5800 feet), New South Wales, in January; two specimens. Besides the neural character, it differs from all the other similar species with dark fuscous palpi, except *T. egenata*, in not having the sharply-defined white basal area of palpi; from *T. egenata* it is readily separated by the smaller size, straight upper portion of hindmargin of forewings, dark fuscous costal marks, absence of subterminal spots, and other details.

73

4. Tax. isomeris, n.sp.

3. 19 mm. Head grey sprinkled with white, face black. Palpi 12, black. Antennæ grey. Thorax pale ochreous-grey. Abdomen whitish-grey. Legs dark grey, posterior pair irrorated with paler. Forewings triangular, hindmargin straight above, rounded beneath; 12 connected by bar with 11; grey, suffusedly irrorated with light greyish-ochreous, especially towards costa; costa shortly and suffusedly strigulated with dark grey; two small triangular blackish spots on costa at 2 and 2; a short mark of mixed blackish and ochreous scales on inner margin at 1, and a dot between this and first costal spot; a moderate outwards-curved series of similar dots from second costal spot to a short mark on inner margin at $\frac{3}{4}$, slightly sinuate inwards on lower third; a rather large black dot in disc above middle; faint traces of a paler waved subterminal line; a hindmarginal series of black dots: cilia grey irrorated Hindwings with hindmargin rounded; grey; a with black. darker discal dot; a short cloudy dark grey mark on inner margin at 2, with faint indications of a continuous transverse line; hindmarginal dots and cilia as in forewings, but more obscure.

Albany, West Australia, in December; one specimen. This species is very well characterised by the triangular black costal spots.

5. Tax. exsectaria, Walk.

(Panagra exsectaria, Walk. 1011.)

 $\Im Q$. 17-21 mm. Head ochreous-whitish, more or less ferruginous-tinged, face ferruginous, back of crown grey. Palpi 2, ferruginous, base whitish. Antennæ pale grey. Thorax light ashy-grey, sometimes with a few black scales. Abdomen whitish-grey. Legs rather dark fuscous, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin slightly sinuate on upper half, rounded beneath; 12 connected by bar with 11; grey, finely irrorated with ashy-whitish, and sometimes with a few black scales, in Q more or less suffusedly irrorated with brownish on

median area; a small blackish-grey spot on costa at 1, and another at $\frac{3}{4}$; a slender almost straight ferruginous streak from beneath first costal spot to 1 of inner margin, marked with a cloudy black dot in disc and two towards inner margin; a moderate blackish dot in disc above middle; a sinuate ferruginous line, marked with blackish dots, from near beneath and beyond second costal spot to inner margin at 3, followed by a more or less marked cloudy dark grey shade, separated from it by a fine pale line; generally a subterminal series of cloudy blackish dots, sometimes obsolete, in Q followed by a denticulate pale line; a hindmarginal series of black dots: cilia light grey. Hindwings with hindmargin rounded; light grey, in Q irrorated with dark fuscous; a dark fuscous discal dot, sometimes indistinct; a more or less marked slightly sinuate dark grey line at 2/3, more distinct towards inner margin, sometimes almost obsolete; in Q subterminal dots and line as in forewings, but more obscure; a hindmarginal series of black dots; cilia light grey.

Sydney and Bathurst (2500 feet), New South Wales; Adelaide, South Australia; York, Perth, and Albany, West Australia; from September to December, common. Readily recognisable by the small size and neat appearance, the well-marked ferruginous first line, and especially the ferruginous colouring of the head.

6. Tax. anthracopa, n.sp.

3. 21-23 mm. Head grey, sometimes becoming whitish-ochreous anteriorly, face black. Palpi 1\frac{2}{3}, blackish, towards base white beneath. Antennæ and thorax grey. Abdomen whitish-grey, sprinkled with blackish. Legs dark grey, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin almost straight above, rounded beneath; 12 connected bybar with 11; grey, finely sprinkled with black; costal edge slenderly ochreous-yellowish anteriorly; a very obscure darker mark on costa at \frac{2}{5}, one on inner margin at \frac{2}{5}, and a dot in disc between these; a moderate blackish dot in disc above middle; an obscure darker mark on costa at \frac{3}{4}; a sinuate series of blackish dots, posteriorly obscurely margined with paler, from beneath and

slightly beyond this to inner margin at $\frac{3}{4}$, sometimes followed by an obscure darker grey shade towards inner margin; a subterminal series of small cloudy blackish spots, sometimes reduced to dots; a hindmarginal series of black dots: cilia with basal half light grey sprinkled with black, terminal half grey-whitish. Hindwings with hindmargin rounded; colour, hindmarginal dots, and cilia as in forewings; a blackish discal dot; an indistinct sinuate darker line at $\frac{3}{5}$, obscurely margined posteriorly with paler; a subterminal series of small darker spots obscurely defined, sometimes obsolete.

Sydney, New South Wales; Deloraine, Tasmania; in September and December, four specimens. Differs from all the species with black and white palpi by the yellowish costal edge of forewings; characterised also by the absence of ferruginous lines, and comparative shortness of palpi.

7. Tax. delogramma, n.sp.

32. 20-24 mm. Head ochreous-whitish, face dark fuscous. Palpi 2, dark fuscous, white towards base. Antennæ whitish spotted with fuscous. Thorax whitish-grey. Abdomen very pale greyish-ochreous, sprinkled with black. Legs pale brownishochreous, femora and posterior tibiæ whitish-ochreous irrorated with dark fuscous. Forewings triangular, hindmargin in & faintly, in Q distinctly sinuate above, rounded beneath; 12 connected by bar with 11; pale greyish-ochreous, sprinkled with black; a dark fuscous dot on costa about $\frac{1}{3}$, another on inner margin at $\frac{1}{3}$, and two between these; a moderate blackish dot in disc above middle; a short dark fuscous mark on costa at 3; an ill-defined sinuate ferruginous line, marked with blackish dots, from beneath and beyond this to inner margin at $\frac{3}{4}$, often followed by a cloudy rather dark fuscous shade; beyond this a subterminal series of small cloudy blackish spots or dots, posteriorly margined by paler marks, and sometimes followed by short dark streaks on veins; a hindmarginal series of black dots: cilia ochreous-whitish, basal half sprinkled and sometimes obscurely barred with dark fuscous, separated by a well-defined dark fuscous median line, becoming lighter towards anal angle. Hindwings with hindmargin rounded; colour, hindmarginal dots, and cilia as in forewings; a dark fuscous discal dot; a rather irregularly sinuate more or less indistinct darker line at $\frac{2}{3}$, often marked with a series of blackish dots, sometimes margined posteriorly by a fine pale line.

Duaringa, Queensland; Sydney, Blackheath (3500 feet), and Bathurst (2500 feet), New South Wales; Melbourne and Beechworth, Victoria; Deloraine and Georges Bay, Tasmania; Mount Lofty, South Australia; York and Albany, West Australia; from October to January, common everywhere. This common species appears to have been hitherto confused with the next, and to have received no distinctive name; its special character is the strongly-marked dark line of the cilia, but it may also be separated from T. intextata by the dark fuscous (not ferruginous-tinged) palpi, and the straighter hindmargin of forewings in δ .

8. Tax. intextata, Gn.

(Panagra intextata, Gn. X. 130; P. perlinearia, Walk. 998; P. areniferata, ib. 998; P. explicataria, ib. 999; P. inconcisata, ib. 1003.)

30. 22-28 mm. Head whitish-ochreous, face deep ferruginousfuscous. Palpi 2, deep ferruginous, base ochreous-whitish. Antennæ ochreous-whitish. Thorax and abdomen pale grevishochreous sprinkled with black. Legs light brownish-ochreous, femora and posterior tibiæ whitish-ochreous sprinkled with dark fuscous. Forewings triangular, hindmargin above distinctly sinuate in both sexes, rounded beneath; pale greyish-ochreous or grey-brownish, sprinkled with black, in Q more brownish or sometimes yellow-ochreous; a very faint ochreous line from 1/3 of costa to $\frac{1}{3}$ of inner margin, posterior edge often marked with three or four dark fuscous dots; a moderate blackish dot in disc above middle; a cloudy dark fuscous mark on costa at $\frac{3}{4}$; a sinuate yellowish-ochreous line or cloudy streak from beyond and beneath this to inner margin at 3, marked with a series of dark fuscous dots sometimes connected by a fuscous line; a subterminal series of small blackish spots, in Q obscure or obsolete; a hindmarginal series of black dots: cilia whitish-fuscous, whitish-ochreous, or grey-whitish, base sometimes with a few scattered dark fuscous scales. Hindwings with hindmargin rounded; colour, hindmarginal dots, and cilia as in forewings; a dark fuscous discal dot; a nearly straight often indistinct pale ochreous line or streak at $\frac{2}{3}$, marked with a series of dark fuscous dots or fuscous line.

Toowoomba (2000 feet), Queensland; Sydney, New South Wales; Mount Lofty, South Australia; from August to December, very common. Differs from all the nearest-allied species by the very deep ferruginous palpi; in colouring it is otherwise very variable. Under the head of *P. inconcisata*, Walker has included with this species specimens also of the preceding; it is also likely enough that Guénée's description refers to both; but as neither of these makes any mention of the conspicuous dark line in the cilia which characterises *T. delogramma*, I refer these descriptions to this species.

9. Tax. egenata, Walk.

(Panagra egenata, Walk. 997.)

3. 28 mm. Head grey-whitish, face blackish. Palpi 12, dark fuscous, base mixed with paler. Antennæ whitish. Thorax and abdomen whitish-grey, with a few black scales. Legs pale grey, femora and posterior tibiæ sprinkled with blackish. Forewings triangular, hindmargin sinuate above, rounded beneath; 12 connected by bar with 11; pale ochreous-grey, sprinkled with fine black scales; a blackish dot in disc at 1, and one near inner margin at 1/3; a moderate blackish dot in disc above middle; a nearly straight fine obscure ochreous-whitish line from towards costa at 4 to inner margin at 3, margined anteriorly by a series of blackish dots; a subterminal series of blackish dots, two lowest sometimes confluent into an irregular spot; a hindmarginal series of black dots: cilia fuscous-whitish, basal half somewhat sprinkled with fuscous, with a light fuscous median line. Hindwings with hindmargin rounded; colour, hindmarginal dots, and cilia as in forewings; a blackish discal dot; a gently-curved fine obscure ochreous-whitish line at 2, anteriorly margined with a series of blackish dots.

Duaringa, Queensland, in July; three specimens received from Mr. G. Barnard. Separable from the similar species with dark fuscous paipi, except *T. oraula*, by their not having the base sharply white; from *T. oraula* by the sinuate hindmargin of forewings, difference in neuration, and other characters noted above.

10. Tax. intermixtaria, Walk.

(Panagra intermixtaria, Walk. 1000; P. promelanaria, ib. 1666.)

3. 24-25 mm. Head ochreous-white, face dark fuscous. Palpi 2, dark fuscous, base white. Antennæ whitish. Thorax and abdomen grey-whitish. Legs light grey, femora and posterior tibiæ whitish sprinkled with dark grey. Forewings triangular, hind-margin straight above, rounded beneath; 12 connected by bar with 11; pale whitish-grey, suffusedly irrorated with ochreous-whitish, and with fine scattered black scales; a black dot in disc at \frac{1}{3}, and another above inner margin at \frac{2}{5}; a black dot above middle of disc; a black dot on costa at \frac{3}{4}; a sinuate series of black dots from beneath and rather beyond this to \frac{3}{4} of inner margin; a hindmarginal series of black dots: cilia whitish-grey, terminal half whitish, dividing line grey, distinct. Hindwings with hindmargin rounded; colour, hindmarginal dots, and cilia as in forewings; a blackish discal dot; a somewhat sinuate series of very indistinct darker dots at \frac{2}{3}, followed by traces of a paler line.

Bathurst (2500 feet), New South Wales, in November; three specimens. Characterised by the pale colouring, absence of ochreous markings and of subterminal spots, and presence of distinct line in cilia.

11. Tax. epigypsa, n.sp.

3. 20 mm. Head, antennæ, thorax, abdomen, and legs whitish; face blackish. Palpi 1²₃, blackish, base white. Forewings rather elongate-triangular, hindmargin straight above, rounded beneath; 12 connected at a point with 11; ochreous-whitish, with a few fine scattered black scales; a moderate blackish dot in disc above middle; a series of indistinct fuscous dots marked with black

scales from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, curved outwards on upper $\frac{2}{3}$; a subterminal series of small indistinct fuscous spots marked with black scales; a hindmarginal series of large black dots: cilia whitish. Hindwings with hindmargin rounded; ochreous-whitish, with scattered blackish scales on lower half; hindmarginal dots and cilia as in forewings.

Quorn, South Australia, in October; one specimen. This is not in very good condition, but is certainly a good species, most resembling the preceding, but well distinguished by the somewhat more elongate wings, smaller size, relatively shorter palpi, subterminal spots, and the large size of hindmarginal dots; from the rest its ochreous-whitish colouring readily separates it.

12. Tax. isophanes, n.sp.

32. 22-27 mm. Head whitish-grey, forehead whitish-ochreous, face dark fuscous. Palpi 2, dark fuscous, base white. Antennæ grey-whitish. Thorax and abdomen pale grev, with scattered dark fuscous scales. Legs dark grey, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin straight above, rounded beneath; 12 connected by bar with 11; grey, suffusedly irrorated with pale greyish-ochreous, with fine scattered black scales; an indistinct dark fuscous dot on costa at 1/3, a second on inner margin about 2, and two more distinct in a straight line between these; a moderate dark fuscous dot in disc above middle; a fine slightly curved and sinuate cloudy fuscous line from about $\frac{3}{4}$ of costa to $\frac{3}{4}$ of inner margin, marked with obscure dark fuscous dots; a subterminal series of small obscure cloudy dark fuscous spots; a hindmarginal series of black dots: cilia pale greyishochreous, basal half mixed with grey. Hindwings with hindmargin rounded; light fuscous irrorated with darker, becoming darker posteriorly; hindmarginal dots and cilia as in forewings.

Murrurundi (1500 feet), New South Wales; Melbourne, Victoria; Mount Lofty, South Australia; in October, four specimens. An obscure-looking species, characterised by the dull colouring, absence of ochreous lines, slightly curved second line not angulated near costa, and presence of subterminal spots.

13. Tax. philodora, n.sp.

3. 20 mm. Head whitish-ochreous, forehead more whitish, face dark ferruginous-fuscous. Palpi 2, dark ferruginous-fuscous, towards base white. Antennæ, thorax, abdomen, and legs whitishochreous. Forewings triangular, hindmargin oblique, straight above, rounded beneath; 12 connected by bar with 11; whitishochreous, irrorated with yellowish-ochreous in disc; a straight thick blackish line from beyond $\frac{1}{3}$ of costa to beyond $\frac{1}{3}$ of inner margin, interrupted immediately beneath costa, preceded except on costa by a brownish suffusion; a thick blackish inwards-curved and twice sinuate line from hindmargin below apex to inner margin at $\frac{3}{4}$, followed by a brownish suffusion, and interrupted near upper extremity by a straight cloudy whitish subterminal shade running from near costa to anal angle; space between this and hindmargin marked with fine dark fuscous strigulæ and scattered black scales: cilia whitish-ochreous mixed with dark fuscous (imperfect). Hindwings with hindmargin rounded; whitish-ochreous, fuscous-tinged, with scattered dark fuscous scales; three parallel cloudy dark fuscous lines starting from lower third of inner margin but not reaching far across wing; cilia whitish mixed with fuscous (imperfect).

Carnarvon, West Australia; one specimen in October. Exceptionally distinct.

2. DARANTASIA, Walk.

Face with projecting cone of scales. Tongue developed. Antennæ in ♂ shortly bipectinated almost to apex, pectinations terminating in pencils of cilia. Palpi rather long, porrected, rough-scaled. Forewings with vein 10 anastomosing with 9, 11 anastomosing strongly with 10 before 9, 12 connected by bar with 11. Hind wings with veins 6 and 7 stalked.

Nearly related to *Nearcha*, and doubtless a development of it; contains only the one species, which in superficial appearance shows some reversionary tendency towards *Dichromodes*.

14. Dar. flavicapitata, Gn.

(Tephrina flavicapitata, Gn. X. 98; T. capitata, Walk. 965; Darantasia mundiferaria, ib. 1743.)

32. 29-33 mm. Head pale yellowish, face dark fuscous. Palpi 21-3, dark fuscous, beneath yellowish-white towards base. Antennæ ochreous-whitish, obscurely spotted with fuscous. Thorax fuscous. Abdomen light fuscous, basal segment with a deep ochreous apical band. Legs fuscous. Forewings triangular, hindmargin bowed, slightly waved; fuscous, sprinkled with black, especially in Q, in 3 irrorated with light greyish-ochreous; lines ochreous-whitish, well-marked, thicker in Q; first almost straight from beyond \(\frac{1}{4} \) of costa to 2 of inner margin, anteriorly margined with ferruginous in disc; a small transverse-oval blackish ring in disc above middle, obscurely ferruginous-tinged; second line from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, upper \(\frac{2}{3} \) very slightly curved outwards, posteriorly margined with ferruginous except towards costa; an obscurely indicated irregular sinuate and dentate pale subterminal line, beyond which the hindmarginal area is suffusedly irrorated with ochreous-whitish; a hindmarginal series of black dots: cilia fuscous or whitish-fuscous, irrorated and sometimes obscurely barred with ochreous-whitish. Hindwings with hindmargin rounded; pale fuscous, more or less sprinkled with dark fuscous; an obscure sinuate pale line at 2/3, in 3 almost obsolete; hindmarginal dots and cilia as in forewings.

Blackheath (3500 feet), New South Wales; Mount Lofty, South Australia; in October, common.

3. Nearcha, n.g.

Face with projecting cone of scales. Tongue developed. Antennæ in 3 bipectinated almost or quite to apex. Palpi moderate or long, porrected, with long rough projecting scales. Thorax hairy beneath. Forewings with vein 10 anastomosing or connected at a point with 9, 11 anastomosing strongly with 10 before 9. Hindwings with veins 6 and 7 stalked.

Presumably a development from *Dichromodes*, but the gap between them is rather considerable. There is a good deal of affinity to *Epidesmia*, but apparently collateral. The species are dull-coloured and superficially extremely similar, though fortunately they possess admirable points of distinction in the tufts which the 3's often possess on the lower surface of the hindwings or sides of abdomen. The colour and length of the palpi also afford good characters; those species which have long palpi have also the frontal tuft elongate. The genus is endemic; but the New Zealand genus *Theoxena* approaches it rather nearly.

1. Abdomen in 3 with large lateral tufts on 5th	
segment	18. paraptila.
Abdomen in 3 without lateral tufts	2.
2. Palpi long $(3\frac{1}{2})$, pale ochreous	3.
Palpi moderate $(2-2\frac{1}{2})$, blackish	5.
3. Hindwings in 3 beneath with blackish sub-	
costal tuft at $\frac{1}{4}$	19. subcelata.
Hindwings in & beneath without blackish sub-	
costal tuft at $\frac{1}{4}$	4.
4. Hindwings in 3 beneath with subcostal spot	
of short pale hairs	20. atyla.
Hindwings in \mathcal{F} beneath without subcostal spot	
of short pale hairs	21. curtaria
5. Hindwings in 3 beneath with subcostal tufts	6.
Hindwings in & beneath without subcostal	
tufts	15. staurotis.
6. Hindwings in 3 beneath with two blackish	
subcostal tufts	16. buffalaria.
Hindwings in 3 beneath with one blackish sub-	
costal tuft	17. aridaria.

15. Nearch. staurotis, n.sp.

₹Q. 25-27 mm. Head grey-whitish, between antennæ yellowish-white, face dark fuscous. Palpi 2-2½, blackish-fuscous, basal

half obliquely white. Antennæ grey-whitish, pectinations dark grey. Thorax whitish-grey. Abdomen grey-whitish, with a few scattered dark grey scales, basal segment in 3 whitish-ochreous towards apex. Legs pale greyish-ochreous, femora sprinkled with dark fuscous, posterior legs ochreous-whitish. Forewings triangular, hindmargin bowed; pale ochreous-grey, finely sprinkled with blackish; four blackish dots or small spots forming a slightly curved series from \frac{1}{3} of costa to \frac{2}{5} of inner margin; a small transverse-oval blackish-grey pale-centred spot in disc above middle; an indistinct whitish or pale ferruginous gently curved line from 2 of costa to 3/4 of inner margin, slightly sinuate inwards towards inner margin, margined anteriorly by a series of black dots or small triangular spots, and followed on lower 2 by a more or less developed blackish-grey shade, broadening downwards; a faint cloudy paler subterminal line; a hindmarginal series of black dots: cilia light ochreous-grey. Hindwings with hindmargin rounded; in 3 without tufts beneath; colour, subterminal line, hindmarginal dots and cilia as in forewings; a faint curved whitish line beyond middle, anteriorly margined with cloudy suffused blackish dots.

Geraldton, West Australia; in November, common.

16. Nearch. buffalaria, Gn.

(Panagra buffalaria, Gn. X. 128; P. ursaria, ib. 129; P. transactaria, Walk. 999; P. resignata, ib. 1003; ? P. reserata, ib. 1010.)

 $\Im Q$. 26-32 mm. Head light ochreous-grey, face blackish. Palpi $2\frac{1}{2}$, blackish, towards base white. Antennæ grey-whitish. Thorax and abdomen light ochreous-grey. Legs light greyish-ochreous, femora and posterior tibiæ sprinkled with blackish, middle and posterior femora roughly haired beneath, posterior tibiæ in \Im dilated, enclosing pencil of hairs in groove. Forewings triangular, hind-margin bowed, waved, in \Im slightly sinuate beneath apex; ochreous-grey, with fine scattered dark fuscous scales; costal edge more or less distinctly pale ferruginous; a blackish dot in disc at $\frac{1}{3}$, one on inner margin at $\frac{2}{5}$, and one on fold between these, sometimes preceded by traces of a whitish anteriorly ferruginous-margined

line; a small transverse-oval fuscous pale-centred spot above middle of disc; a faint paler or ochreous-whitish line from towards costa at $\frac{3}{4}$ to $\frac{3}{4}$ of inner margin, sinuate outwards in middle of disc, margined anteriorly by a series of black triangular dots and posteriorly by a pale ferruginous shade; a faint fuscous shade beyond this; a hindmarginal series of blackish dots: cilia light grey or greyish-ochreous, sometimes with a fuscous interrupted line. Hindwings with hindmargin rounded; in \mathcal{J} on undersurface with a large subcostal tuft of greyish-ochreous hairs mixed with dark fuscous at $\frac{1}{4}$, a smaller similar subcostal tuft in middle, and a ridge of pale greyish-ochreous hairs in disc beneath these; grey, sprinkled with dark fuscous; sometimes a faint pale curved median line, preceded by cloudy suffused blackish dots; hindmarginal dots and cilia as in forewings.

Sydney, New South Wales; Tasmania; Mount Lofty, South Australia; Perth, West Australia; from August to October and in March, common.

17. Nearch. aridaria, Walk.

(Tephrina aridaria, Walk. Suppl. 1662.)

 \Im Q. 25-28 mm. Head whitish-grey, becoming ochreous-whitish on forehead, face blackish. Palpi 2, blackish, towards base white. Antennæ grey-whitish. Thorax and abdomen pale grey or whitish-grey, with a few blackish scales. Legs grey, femora and posterior tibiæ grey-whitish sprinkled with dark fuscous, middle and posterior femora partly rough-haired beneath. Forewings triangular, hind-margin bowed, waved; light ochreous-grey, with scattered dark grey scales; costal edge more or less distinctly pale ochreous; a slightly curved blackish line from $\frac{1}{3}$ of costa to $\frac{2}{3}$ of inner margin, in Q reduced to four dots; a transverse-oval sometimes obscurely pale-centred blackish spot in disc above middle, in Q much paler or obsolete; a blackish irregular line from before $\frac{3}{4}$ of costa to $\frac{3}{4}$ of inner margin, upper $\frac{2}{3}$ moderately curved outwards and sinuate above middle, in Q reduced to a series of black dots connected by an obscure grey line; in \Im this is closely followed except towards

costa by a cloudy blackish-grey shade, posteriorly somewhat mixed with ochreous, in Q represented by an obscure ochreous line; a series of very indistinct cloudy grey subterminal spots; a hind-marginal series of black dots: cilia pale grey, with a faint interrupted darker line. Hindwings with hindmargin rounded; in 3 on undersurface with a thin subcostal ridge of pale greyish-ochreous hairs terminating beyond middle in a small tuft mixed with dark fuscous; colour, hindmarginal dots, and cilia as in forewings; a blackish-grey discal dot, in Q sometimes obsolete; a cloudy blackish-grey median line, slightly angulated in middle, sinuate beneath, in Q obscure or obsolete.

Duaringa, Queensland; Bathurst (2500 feet), New South Wales; in November and March, common.

18. Nearch. paraptila, n.sp.

3. 28 mm. Head fuscous-whitish, face dark ferruginous-fuscous. Palpi 2, fuscous. Antennæ fuscous-whitish. Thorax whitish-fuscous. Abdomen whitish-fuscous, with a few dark fuscous scales, 4th segment with a small lateral pencil of hairs, and a small horny ventral hook, 5th segment with a large tuft of blackish hairs on each side, mixed with pale greyish-ochreous. Legs fuscous, posterior pair fuscous-whitish. Forewings triangular, hindmargin bowed; whitish-fuscous, sprinkled with dark fuscous; faint traces of a pale ferruginous line from \(\frac{1}{3} \) of costa to \(\frac{2}{5} \) of inner margin, preceded by three blackish dots on veins; a transverse linear dark fuscous mark in disc above middle; traces of a pale ferruginous irregular line, posteriorly marked with a series of blackish dots, from ²/₃ of costa to ²/₃ of inner margin, upper ²/₃ rather strongly curved outwards, sinuate inwards above middle and towards inner margin; a subterminal series of dark fuscous dots; a hiudmarginal series of blackish dots: cilia whitish-fuscous (imperfect). Hindwings with hindmargin rounded; without tufts beneath; colour, subterminal and hindmarginal dots, and cilia as in forewings; a faint ferruginous median line, marked with blackish dots, sinuate outwards in middle.

Toowoomba, Queensland; in December, one specimen.

19. Nearch. subcelata, Walk.

(Panagra subcelata, Walk. 997.)

39. 27-28 mm. Head and thorax pale brownish-ochreous. Palpi 3½, pale greyish-ochreous, in Q fuscous-tinged. Antennæ and abdomen ochreous-whitish. Legs light fuscous, femora and posterior tibiæ ochreous-whitish sprinkled with dark fuscous. Forewings triangular, hindmargin sinuate on upper half, rounded beneath; whitish-ochreous, slightly brownish-tinged, more decidedly in Q, finely sprinkled with dark fuscous; a slightly curved series of four black dots from beneath costa at \(\frac{1}{4} \) to \(\frac{1}{3} \) of inner margin; a very small dark fuscous pale-centred spot in disc above middle, sometimes reduced to a dot without pale centre; a faintly sinuate series of black dots from beneath $\frac{3}{4}$ of costa to $\frac{2}{3}$ of inner margin, followed in Q by a paler yellowish-tinged line; a small cloudy blackish spot immediately beyond this in middle, in Q obsolete; a hindmarginal series of black dots: cilia pale whitish-ochreous, in Q brownish-tinged, with a somewhat darker interrupted basal line. Hindwings with hindmargin rounded; in 3 on undersurface with a large subcostal tuft of pale greyish-ochreous hairs mixed with blackish at $\frac{1}{4}$, beyond which is a considerable space clothed with short appressed pale greyish-ochreous hairs; pale whitishochreous-grey, in Q somewhat brownish-tinged; sometimes an obscure darker discal dot; hindmarginal dots and cilia as in forewings.

Newcastle, Sydney, and Bathurst (2500 feet), New South Wales; Warragul, Victoria; in April, not uncommon.

20. Nearch. atyla, n.sp.

3Q. 28-29 mm. Only differs from *N. subcelata* as follows: head white on crown; hindwings in 3 on undersurface with a small spot of short appressed pale greyish-ochreous hairs beneath costa before middle, without tuft, and with a well-marked dark fuscous discal dot.

Perth and Albany, West Australia, in November; three specimens.

21. Nearch. curtaria, Gn.

(Panagra curtaria, Gn. X. 129; P. corrogata, Walk. 997.)

3Q. 28-31 mm. Head, thorax, and abdomen pale whitishochreous. Palpi 31, whitish-ochreous, externally mixed with fuscous, base white. Antennæ whitish, pectinations grey. Legs pale ochreous, posterior pair whitish, femora sprinkled with dark fuscous. Forewings triangular, hindmargin sinuate on upper half, slightly rounded beneath; whitish-ochreous, with a few scattered dark fuscous scales, towards costa faintly strigulated with pale brownish; a black dot in disc at 1, one on inner margin at 1, and a third between these; a small roundish dark fuscous pale-centred spot in disc above middle, sometimes reduced to a dot without pale centre; a series of cloudy blackish dots, partially connected by an incomplete obscure dark fuscous line, from $\frac{3}{4}$ of costa to $\frac{2}{3}$ of inner margin, rather strongly sinuate outwards on middle third, and inwards on lower third, nearly followed on lower 23 by an obscure brownish-ochreous line; a hindmarginal series of black dots: cilia pale whitish-ochreous. Hindwings with hindmargin almost straight, slightly waved, apex prominent; in & without tufts beneath; ochreous-whitish, sprinkled with pale grey; a hindmarginal series of black dots; cilia ochreous-whitish.

Sydney, New South Wales; Hobart, Tasmania; in March, rather common locally. The different form of the hindwings makes this species easy of recognition.

4. Satraparchis, n.g.

Tongue developed. Antennæ in 3 unipectinated, towards apex simple. Palpi moderately long, porrected, rough-scaled. Forewings with vein 10 out of 9, 11 anastomosing shortly with 9. Hindwings with veins 6 and 7 short-stalked.

Certainly a development of *Epidesmia*, containing only the following species.

22. Satr. bijugata, Walk.

(Panagra bijugata, Walk. 1663; Melanippe teliferata, ib. 1712).

30. 30-32 mm. Head dark fuscous, with a whitish transverse line below forehead. Palpi dark fuscous, base whitish. Antennæ black with a white line on back. Thorax (partly defaced) blackish, patagia slenderly margined with whitish. Abdomen blackish, segmental margins whitish. Legs black, sprinkled with white. Forewings triangular, hindmargin rounded; blackish, sprinkled with white towards base; a yellowish-white fascia from middle of costa to anal angle, margins straight, broadest on costa and enclosing a blackish median bar from costa reaching to near middle; a pale bluish line close beyond fascia, becoming yellowish-white on anal angle, where it coalesces with a yellowish-white somewhat irregular submarginal line; branches of subcostal vein beyond fascia finely whitish-ochreous, terminating in small spots on hindmargin; between these are more or less distinct fine blue-whitish lines: cilia blackish, with a fine white basal line, tips grey-whitish, on anal angle wholly yellowish-white. Hindwings with hindmargin rounded; yellowish-white; a moderate transverse blackish discal spot; a broad blackish hindmarginal band, anterior edge sinuate, attenuated to anal angle, containing a triangular yellowish-white spot in its lower extremity; cilia yellowish-white.

Rockhampton and Duaringa, Queensland; Grafton, New South Wales; in August, four specimens (Coll. Macleay).

5. EPIDESMIA, Westw.

Face smooth or with slightly projecting scales. Tongue developed. Antennæ in 3 unipectinated, towards apex simple. Palpi long or extremely long, porrected, rough-scaled, attenuated. Forewings with vein 10 touching or anastomosing with 9, 11 anastomosing with 10. Hindwings with veins 6 and 7 approximated at base.

Presumably a development from *Dichromodes*, or perhaps collaterally with it from an earlier form; confined to Australia. The species, though sometimes comparatively large, are slenderly built; but I conjecture that the prominence of the apex of hindwing, often a well-marked feature, is due to an exaggeration of the prolonged form of wing characteristic of the heavily built genera, and points back to an origin from these.

1.	Hindwings blackish, with orange discal blotch Hindwings not blackish, with orange discal	23.	tricolor.
	blotch		2.
2.	Hindwings orange	26.	chilonaria.
	Hindwings not orange		3.
3.	Hindwings white	25.	replicataria.
	Hindwings not white		4.
4.	Forewings with three white lines from costa		
	converging to anal angle	24.	transcissata.
	Forewings without three white lines from		
	costa converging to anal angle		5.
5.	Face and palpi blackish-fuscous		6.
	Face and palpi not blackish-fuscous		7.
6.	Forewings dark fuscous	30.	oxyderces.
	Forewings brownish-ochreous		
7.	Cilia with dark fuscous basal line	31.	reservata.
	Cilia without dark fuscous basal line		8.
8.	Palpi 6, ochreous-fuscous	27.	hypenaria.
	Palpi 4, whitish-yellowish, fuscous-tinged		

23. Ep. tricolor, Westw.

(*Epidesmia tricolor*, Westw., Duncan's Exot. Moths, 220, pl. XXVIII. 1.)

δQ. 64 mm. Head, palpi, antennæ, thorax, and legs dark fuscous; palpi 4, at base beneath yellowish-white. Abdomen whitish-sulphur, towards base fuscous. Forewings triangular, hindmargin sinuate beneath apex, rounded; dark fuscous, ochreous-tinged, towards hindmargin somewhat lighter; a moderate whitish-sulphur fascia from middle of costa to inner margin before anal angle, narrowed beneath, anterior edge almost straight, posterior edge projecting triangularly below middle: cilia grey, with a dark grey line, at apex white. Hindwings with apex rather prominent, hindmargin almost straight; blackish; a large yellowish-orange irregular roundish spot in middle of disc; two snow-white marginal dots at and above apex; cilia blackish, above apex snow-white.

Sydney, New South Wales; ten specimens (Coll. Macleay). I am informed by Mr. Masters that this large and conspicuous species was common in Sir William Macleay's garden twenty years ago; it then appeared to become extinct, without apparent reason, and was not seen again there or elsewhere until quite lately, when it has once more reappeared in the same locality.

24. Ep. transcissata, Walk.

(Phrataria transcissata, Walk. 1742.)

30 mm. Forewings dark fuscous; all veins fuscous-whitish; a straight narrow white fascia from costa before middle, a white line from costa at $\frac{2}{3}$, and a white line from apex before hind-margin, all converging to anal angle; a whitish shade nearly preceding fascia on lower half; a darker transverse spot, margined with whitish, in disc beyond fascia. Hindwings pale grey; a discal grey ring, containing a very small similar ring; an indistinct whitish line at $\frac{2}{3}$, and another before hindmargin.

Diagnosis taken from type in British Museum.

25. Ep. replicataria, Walk.

(Phrataria replicataria, Walk. Suppl. 1700.)

 \Im . 29-30 mm. Head rather dark fuscous, with a yellowish-white transverse line on forehead. Palpi $2\frac{1}{2}$, fuscous, towards base white. Antennæ fuscous, with a white line on stalk, pectinations 4. Thorax rather dark fuscous, becoming white posteriorly. Abdomen white. Legs white, densely irrorated with blackish, anterior pair suffused with blackish except apex of joints. Forewings triangular, hindmargin straight above, rounded beneath; rather dark fuscous; a whitish line along vein 1 from base, meeting the anterior of two closely parallel whites hines from $\frac{1}{5}$ of costa to anal angle; two closely parallel white lines from $\frac{2}{5}$ of costa to middle of disc, curved round and returning to costa at $\frac{3}{5}$; in lower portion of included space is a thick transverse-linear cloudy blackish mark; a nearly straight white streak from $\frac{3}{4}$ of costa to anal angle, rather bent outwards

on costa, anterior margin rather suffused, touching preceding curved line and tending to be produced along branches of median vein, posteriorly sharply defined and closely followed by a fine parallel white line dilated towards lower extremity; a slightly inwards-curved denticulate white line from costa immediately before apex to hindmargin above anal angle; a blackish interrupted hindmarginal line, margined anteriorly by a whitish waved line: cilia fuscous, base and apex white, towards anal angle wholly white. Hindwings with hindmargin rounded; white; a few scattered black scales along inner margin; an interrupted blackish hindmarginal line or row of dots; cilia white; undersurface with a small dark fuscous discal spot, a sinuate line at $\frac{3}{4}$, and an incomplete subterminal fascia, which show through obscurely on upper surface.

Blackheath (3500 feet) and Mount Kosciusko (4700 feet), New South Wales; in January and February, amongst *Eucalyptus*-forest, four specimens.

26. Ep. chilonaria, HS.

(Hemagalma chilonaria, HS. Exot. 350; Panagra aurinaria, Gn. X. 127, pl. vii. 7).

3Q. 38-42 mm. Head ochreous-brown, forehead ochreous-white, face dark ferruginous-fuscous. Palpi 4, deep ferruginous-fuscous, towards base white beneath. Antennæ ochreous-whitish, pectinations 4, fuscous. Thorax ochreous-fuscous, darker anteriorly. Abdomen whitish-fuscous. Legs ferruginous-fuscous, irrorated with ochreous-whitish, anterior pair banded with dark fuscous. Forewings triangular, hindmargin gently rounded; ochreous-fuscous, slightly reddish-tinged, somewhat sprinkled with dark grey; costal edge slenderly ochreous whitish, bordered beneath by a darker suffusion anteriorly; a cloudy dark fuscous dot in disc above middle, another above inner margin before middle, and a third in disc midway between these; a nearly straight slender whitish-ochreous or whitish-fuscous line from near costa at ³/₄ to about ³/₄ of inner margin, margined posteriorly by a cloudy dark

fuscous line disappearing towards upper extremity; a faint subterminal series of small obscure darker spots; a hindmarginal series of black dots, sometimes obsolete: cilia light ochreous-reddish, tips more whitish-ochreous. Hindwings with apex more or less prominent, hindmargin slightly rounded; deep orange; an obscure dark fuscous discal dot; a moderately broad hindmarginal band of thin dark fuscous irroration, towards anal angle becoming wholly fuscous, slightly reddish-tinged, and obscurely continued along inner margin towards base, gradually becoming obsolete; a hindmarginal series of blackish dots; cilia light ochreous-reddish.

Newcastle and Sydney, New South Wales; Fernshaw and Dandenong Ranges, Victoria; in November and December, flying readily in the sunshine, six specimens.

27. Ep. hypenaria, Gn.

(Panagra hypenaria, Gn. X. 128; ? Hemagalma inspersa, Feld. pl. cxxix. 19.)

32. 32-41 mm. Head brownish-ochreous, crown sometimes ochreous-whitish. Palpi 6, ochreous-fuscous, darker beneath, towards base yellowish-white beneath. Antennæ whitish-fuscous, pectinations 16, dark fuscous. Thorax ochreous-brown. Abdomen whitish-fuscous. Legs rather dark fuscous, femora irrorated with pale greyish-ochreous. Forewings triangular, hindmargin sinuate beneath apex, thence bowed; rather light ochreous-brown or fuscous, more or less irrorated with dark fuscous, suffused with darker towards costa anteriorly; costal edge bright ferruginous towards base, becoming pale whitish-ochreous posteriorly; a cloudy dark fuscous dot in disc above middle, another above inner margin at 2, and a third in disc midway between these; a nearly straight narrow pale ochreous or whitish-ochreous streak from towards costa at \(\frac{3}{4}\) to \(\frac{2}{3}\) of inner margin, posteriorly margined by a cloudy darker fuscous posteriorly suffused shade, dividing line darker and sometimes marked with obscure blackish dots; faint traces of a pale waved subterminal line; a hindmarginal series of black dots: cilia pale brownish-ochreous, base sometimes fuscous. Hindwings with apex prominent, hindmargin almost straight, rounded at extremities; pale fuscous or whitish-fuscous, sometimes ochreoustinged; a dark fuscous discal dot; hindmargin suffused with darker fuscous, forming a very indistinct band containing a faint obscure paler subterminal line; hindmarginal dots and cilia as in forewings.

Glen Innes (3500 feet), Newcastle, Sydney, Blackheath (3500 feet), and Mount Kosciusko (6500 feet), New South Wales; Melbourne and Mount Macedon, Victoria; Deloraine and Georges Bay, Tasmania, from September to February; common. Distinct from all others structurally by the great length of the antennal pectinations and palpi.

28. Ep. tryxaria, Gn.

(Panagra tryxaria, Gn. X. 128.)

39. 28-34 mm. Head ochreous-brown, forehead ochreouswhitish, face blackish, ferruginous-tinged. Palpi 3-31, blackishfuscous, ferruginous-tinged, towards base white beneath. Antennæ whitish, annulated with fuscous or blackish, pectinations 4, dark fuscous. Thorax ochreous-brown, becoming whitish - ochreous posteriorly. Abdomen ochreous-whitish sprinkled with fuscous. Legs rather dark fuscous ringed with whitish, femora and posterior tibiæ whitish irrorated with dark fuscous. Forewings triangular, hindmargin bowed; light brownish-ochreous irrorated with dark fuscous, suffused with darker towards base of costa; costal edge whitish, towards base ochreous-tinged; a cloudy dark fuscous dot in disc above middle, another above inner margin before middle, and a third in disc between these; a straight ochreous, ochreousfuscous, or dark fuscous cloudy line from 4 of costa to 3 of inner margin, slenderer and indistinct above, sometimes marked with a series of dark fuscous dots, margined anteriorly by an ochreouswhitish or whitish-ochreous line, and posteriorly by an obscure fuscous suffusion; a subterminal series of indistinct dark fuscous dots; a hindmarginal series of blackish dots: cilia fuscouswhitish, with an indistinct fuscous line. Hindwings with hindmargin slightly rounded; colour, subterminal and hindmarginal

dots, and cilia as in forewings; an indistinct dark fuscous discal dot, a straight cloudy whitish-ochreous line beyond middle, posteriorly margined on lower half by a dark fuscous streak; traces of a pale waved subterminal line.

Sydney, New South Wales, in November and March; common.

29. Ep. perfabricata, Walk.

(Panagra perfabricata, Walk. 996.)

3Q. 28-37 mm. Head, palpi, and thorax whitish-yellowish tinged with fuscous; palpi 4, base whitish beneath. Antennæ whitish, ringed with pale fuscous, pectinations 4, fuscous. Abdomen whitish. Legs fuscous, femora and posterior tibiæ whitish irrorated with dark fuscous. Forewings triangular, hindmargin bowed; very pale whitish-fuscous, densely irrorated with whitishyellowish, towards costa tinged with brownish-ochreous; costal edge whitish except towards base; a dark fuscous dot in disc above middle, another above inner margin at 2, and a third in disc between these; a straight dark fuscous line from beneath costa at 4 to 3 of inner margin, attenuated and indistinct above, marked with obscure darker dots, anteriorly margined by an ochreouswhitish line; a hindmarginal series of blackish dots: cilia white. Hindwings with hindmargin hardly rounded, apex somewhat prominently rounded; fuscous-whitish, slightly yellowish-tinged; a dark fuscous discal dot; a very slightly curved cloudy whitish line beyond middle, posteriorly margined on lower half by a fuscous streak; a hindmarginal series of blackish dots; cilia white.

Duaringa, Queensland; Bathurst (2500 feet) and Mount Kosciusko (3000 feet), New South Wales; in January, locally common.

30. Ep. oxyderces, n.sp.

3. 31 mm. Head dark ferruginous-brown, forehead ochreous-whitish, face blackish-fuscous. Palpi 3½, dark fuscous, towards base white beneath. Antennæ fuscous, stalk ochreous-whitish towards base, pectinations 4. Thorax dark fuscous, anteriorly ferruginous-tinged. Abdomen fuscous-whitish irrorated with dark

fuscous. Legs fuscous, apex of joints whitish, femora and posterior tibiæ dark fuscous irrorated with whitish. triangular, hindmargin rounded; dark fuscous, anteriorly ferruginous-tinged, posteriorly slightly purplish; an ochreous-whitish streak along costa from base to 4, suffusedly edged beneath with ferruginous, extremities attenuated; a sharply defined straight narrow white streak from 3 of inner margin towards costa at 4, reaching 3/4 across wing, apex acute; a subterminal row of indistinct darker dots; an interrupted blackish hindmarginal line: cilia light reddish, basal half fuscous mixed with ochreous-whitish and obscurely spotted with dark fuscous. Hindwings with hindmargin slightly rounded, apex somewhat prominently rounded; rather dark fuscous, towards hindmargin rather purplish; a darker discal dot; a well-marked ochreous-whitish straight transverse streak beyond middle, interrupted beneath costa; a subterminal series of indistinct dark fuscous dots, preceded by a fine obscure paler waved line; hindmarginal line and cilia as in forewings.

Sydney, New South Wales; in November, one specimen taken in a jungly swamp, where the difficulties of collecting prevented my remaining long; a fine distinct species.

31. Ep. reservata, Walk.

(Panagra reservata, Walk. 996.)

 hindmarginal series of blackish dots: cilia whitish, with a dark fuscous basal line becoming obsolete towards anal angle. Hindwings with hindmargin slightly rounded; colour, subterminal dots, and cilia as in forewings; an obscure darker fuscous discal dot; a faintly sinuate cloudy whitish line beyond middle, posteriorly margined with suffused dark fuscous dots.

Duaringa and Rockhampton, Queensland, in May; three specimens received from Mr. G. Barnard. The antennal pectinations are much longer in this species than in any other except *E. hypenaria*.

6. DICHROMODES, Gn.

Face with short projection of scales. Antennæ in 3 unipectinated, towards apex sometimes simple. Palpi moderate, long, or very long, porrected, densely rough-scaled. Forewings with vein 10 anastomosing with 9, or sometimes separate. Hindwings with veins 6 and 7 approximated at base.

Already a genus of considerable extent, and likely to be much increased. It is confined to Australia, with the exception of two small species found in the mountains of New Zealand; these I suppose to have originated from a stray immigrant entering by way of Tasmania. The genus appears to be a development from forms resembling *Oenone* and *Brephos*. The species are nearly all dull-coloured and sometimes very variable, yet with care they are not difficult to distinguish. The uniformity of structure is remarkable; the only notable variation occurs in the anastomosis or separation of veins 9 and 10 of the forewings, of which both forms are sometimes found in the same species.

1.	Hindwings clear orange in disc	32. ainaria.	
	Hindwings not clear orange in disc	2.	
2.	Forewings with tufts of raised scales	48. steropias	
	Forewings without tufts of raised scales	3.	
3.	Palpi white or whitish towards base beneath	4.	
	Palpi at most irrorated with white beneath	20.	

4	Forewings with irregular reddish-ochreous		
	streaks on veins		5.
	Forewings without irregular reddish-		
	ochreous streaks on veins		8.
5.	Forewings with first line acutely angulated in middle	46.	poecilotis.
	Forewings with first line not acutely angulated in middle		6.
6.	Forewings with a conspicuously pale hind-marginal band	38.	partitaria.
	Forewings without a conspicuously pale hindmarginal band		7.
7,	Forewings with lines strongly marked,		
	white		
	Forewings with lines only partially whitish		
8.	Head whitish-ochreous on crown	35.	odontias.
	Head not whitish-ochreous on crown		9.
9.	Forewings with second line very acutely angulated in middle	34.	anelictis.
	Forewings with second line not very acutely		
	angulated in middle		10.
10.	Head and thorax wholly dark fuscous		11.
	Head and thorax irrorated with whitish		14.
11.	Forewings with whitish-ochreous suffusion		
	towards costa posteriorly	39.	paratacta.
	Forewings without whitish-ochreous suffu-		
	sion towards costa posteriorly		12.
12.	Hindwings ochreous-tinged, with distinct	99	Jimana ania
	darker hindmarginal band	55.	uusemurta.
	Hindwings not ochreous-tinged, without such band		13.
13.	Forewings with cilia mixed with purplish-		
	nod /	36	diemutata

BY E. MEYRICK.

	Forewings with cilia not mixed with		
	purplish-red	42.	lios poda.
14.	Forewings with whitish subcostal streak	61.	confluaria.
	${\bf For ewing s\ without\ whit is h\ subcostal\ streak}$		15.
15:	Forewings with first line sharply angulated		
	beneath costa	57.	is chnot a.
	Forewings with first line not sharply		
	angulated beneath costa		16.
16.	Forewings with second line distinctly		
	angulated in middle		17.
	Forewings with second line not distinctly		10
17	angulated in middle		19.
17.	Forewings with second line angulated inwards on submedian fold	13	ann lamata
	Forewings with second line curved inwards	то.	eapiunaiu.
	on submedian fold		18.
18	Forewings with discal spot pale-centered	19	
10.	Forewings with discal spot wholly blackish		
19.	Forewings with lines whitish		•
10.	Forewings with lines not whitish		
20.	Forewings with large triangular blackish		
	discal spot	62.	personalis.
	Forewings without large triangular blackish		
	discal spot		21.
21.	Palpi light brownish-ochreous	55.	estigmaria.
	Palpi dark fuscous		22.
22.	Forewings with second line obsolete	52.	ophiucha.
	Forewings with second line present		23.
23.	Forewings with second line followed by an		
	ochreous shade	59.	consignata.
	Forewings with second line not followed		
	by an ochreous shade		24.
24.	Forewings with second line marked with a		
	reddish-ochreous spot in middle	54.	molybdaria.

	Forewings with second line not marked		
	with a reddish-ochreous spot in middle		25.
25.	Forewings with second line conspicuously		
	white	60.	stilbiata.
	Forewings with second line not conspicu-		
	ously white		26.
26.	Forewings with second line distinctly	-0	
	dentate throughout	53.	indicataria.
	Forewings with second line not distinctly		27
	dentate throughout		27.
27.	Forewings with first line entire		28.
	Forewings with first line reduced to three		
	or four black dots		31.
28.	Forewings with second line rather sharply		
	angulated in middle		29.
	Forewings with second line not rather		
	sharply angulated in middle		30.
29.	Forewings with median band narrow,		
	darker	58.	triparata.
	Forewings with median band broad, not		
	darker	50.	atrosignata Q .
30.	Forewings with second line pale, entire	50.	atrosignata 3.
	Forewings with second line reduced to a		
	series of pale dots	41.	exsignata.
31.	Forewings with second line angulated in		
	middle	51.	euscia.
	Forewings with second line almost straight	56.	ornata.

32. Dichr. ainaria, Gn.

(Dichromodes ainaria, Gn. IX. 321, pl. III. 5; D. divergentaria, ib. 321; Cidaria metaxanthata, Walk. 1734.)

3Q. 22-24 mm. Head, palpi, antennæ, thorax, and legs dark fuscous; palpi 2½, upper edge sprinkled with whitish; antennal pectinations 4. Abdomen rather dark fuscous. Forewings triangular, hindmargin rounded; dark fuscous, irregularly irrorated

with blackish and grey-whitish; lines cloudy, blackish; first from beyond 1/3 of costa to before middle of inner margin, slightly curved, preceded by whitish irroration; second from before 3 of costa to 2 of inner margin, irregular and more or less denticulate. upper 3 rather curved outwards, sinuate inwards above middle and more deeply below middle, posteriorly margined with whitish irroration; a small blackish spot in disc above middle touching second line; subterminal formed by whitish irroration, irregularly margined with blackish suffusion, irregular, more or less distinctly dentate; a waved blackish hindmarginal line: cilia dark fuscous irrorated with whitish, terminal half grey more or less obscurely barred with darker, tips whitish. Hindwings with hindmargin rounded; orange; a moderate evenly broad dark fuscous hindmarginal band, obscurely continued along inner margin but attenuated to base; cilia rather dark fuscous, tips whitish sometimes obscurely barred with fuscous.

Blackheath (3500 feet) and Bathurst (2500 feet), New South Wales; Melbourne, Victoria; Mount Lofty, South Australia; in November, common.

33. Dichr. diasemaria, Gn.

(Dichromodes diasemaria, Gn. IX. 321.)

 $\Im Q$. 24-27 mm. Head, palpi, antennæ, thorax, and legs dark fuscous; palpi $2\frac{1}{2}$ -3, towards base beneath whitish; antennal pectinations 4. Abdomen whitish-fuscous irrorated with dark fuscous. Forewings triangular, hindmargin straight above, rounded beneath; fuscous, densely irregularly irrorated with blackish and whitish; an indistinct blackish transverse line near base, not reaching inner margin; lines narrow, irregular, blackish; first from $\frac{1}{3}$ of costa to $\frac{2}{5}$ of inner margin, almost straight, followed by an ochreous tinge; second from $\frac{2}{5}$ of costa to $\frac{2}{3}$ of inner margin, hardly curved or sinuate, dentate throughout, followed by a paler space; a blackish thrice deeply indented line between these, space between this and second line suffusedly darker; a transverse blackish mark in disc above middle, nearly touching second line; a very fine brownish-ochreous rather strongly sinuate denticulate

line from $\frac{3}{4}$ of costa to $\frac{3}{4}$ of inner margin; a cloudy grey-whitish twice sinuate subterminal line, margined by dark fuscous suffusions; a waved blackish hindmarginal line: cilia fuscous, base sprinkled with whitish, tips whitish, obscurely barred with darker. Hindwings with hindmargin rounded; ochreous-fuscous, with a somewhat paler curved band at $\frac{3}{4}$, sometimes more or less suffused with yellowish; a cloudy darker fuscous discal dot; a cloudy dark fuscous mark on inner margin at $\frac{2}{3}$; a moderate evenly broad dark fuscous hindmarginal band; cilia fuscous, with a cloudy darker line, tips paler.

Georges Bay, Tasmania; in December and January, six specimens. These are unfortunately mostly in poor condition, and the species appears to vary considerably; this description may therefore require extension.

34. Dichr. anelictis, n.sp.

3Q. 22-23 mm. Head, palpi, and thorax grey mixed with blackish and whitish; palpi 2, base more whitish. Antennæ dark grey spotted with whitish, pectinations 3. Abdomen whitish-grey irrorated with dark grey. Legs dark grey ringed with whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin rounded; light brownish, ochreous-tinged, sprinkled with blackish; three indistinct blackish dentate lines between base and first line, each preceded by some whitish scales; first and second lines fine, blackish, subdentate; first from 2 of costa to middle of inner margin, angulated outwards beneath costa, sinuate below middle, anteriorly finely margined with whitish; second from ³/₅ of costa to ²/₃ of inner margin, forming a very acute angulation outwards in middle, sinuate inwards above this and more deeply below it, posteriorly finely margined with whitish; space between these darker, with denser black irroration, often interrupted at 1 from inner margin by a bar of ground colour, interrupting also both lines; a blackish transverse mark in disc above middle, immediately preceding second line; a large illdefined whitish or whitish-ochreous suffusion towards costa beyond second line, containing a cloudy dark fuscous costal spot;

a cloudy whitish subterminal line; a waved blackish hind-marginal line or series of spots, margined anteriorly with whitish: cilia grey, base irrorated with whitish, terminal half whitish obscurely barred with grey. Hindwings with hindmargin rounded; fuscous-grey, becoming dark grey towards hindmargin; a cloudy darker discal mark, sometimes obsolete; a blackish hindmarginal line: cilia grey-whitish, with a cloudy grey line.

Mount Lofty, South Australia; Geraldton, Perth, and Albany, West Australia; from October to December, common.

35. Dichr. odontias, n.sp.

39. 24 mm. Head whitish-ochreous, face brownish-ochreous, with a few blackish scales. Palpi 2, rather dark fuscous, base whitish. Antennæ fuscous, pectinations 5. Thorax blackish. posteriorly mixed with pale greyish-ochreous. Abdomen pale fuscous. Legs rather dark fuscous, posterior pair light fuscous. Forewings triangular, hindmargin gently rounded; rather light fuscous, sprinkled with black; two cloudy blackish lines towards base, first not reaching inner margin; first and second lines cloudy, blackish, irregularly dentate, slightly curved; first from ² of costa to before middle of inner margin, preceded by a similar parallel line; second from ²/₃ of costa to ²/₃ of inner margin, followed by a similar parallel line; a narrow transverse-oval blackish spot in disc above middle, midway between first and second lines; subterminal indicated by blackish cloudy margins, irregular, subdentate, posterior margin very indistinct; a hindmarginal series of triangular blackish spots connected by a fine line: cilia pale fuscous. Hindwings with hindmargin rounded; fuscousgrey, darker towards hindmargin; cilia fuscous.

Beechworth, Victoria, in December; two specimens received from Mr. G. Barnard.

36. Dichr. disputata, Walk.

(Panagra disputata, Walk. 1009; P. dentigeraria, ib. 1665.)

 $\Im Q$. 22-24 mm. Head, palpi, antennæ, and thorax dark fuscous; palpi $2\frac{1}{4}$, base white beneath; antennal pectinations 4.

Abdomen dark grey. Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with grey-whitish. Forewings triangular, hindmargin rounded; dark grey, sprinkled with black and a few whitish scales, more or less tinged and sometimes suffusedly mixed with deep purple-reddish; two cloudy blackish lines towards base; first and second lines cloudy, blackish, irregularly dentate, slightly curved; first from 2 of costa to before middle of inner margin, preceded by a similar parallel line; second from ²/₄ of costa to ³/₄ of inner margin, sometimes partially whitishmargined posteriorly, followed by a similar parallel line; a narrow transverse-oval blackish spot in disc above middle; subterminal indicated by cloudy darker margins, irregular, subdentate, anterior rather broad and marked with blackish on veins, posterior very indistinct; a hindmarginal series of triangular blackish spots connected by a fine line: cilia light fuscous, basal half irrorated or suffused with purplish-red, sometimes obscurely barred with darker. Hindwings with hindmargin rounded; fuscous-grey, darker towards hindmargin, hindmarginal line dark fuscous; cilia fuscous, towards tips whitish-fuscous.

Maryborough, Queensland; Sydney, New South Wales; also from Victoria; in October and March, rather common.

37. Dichr. compsotis, n.sp.

3. 21 mm. Head and thorax blackish-fuscous mixed with white. Palpi 2½, fuscous, base whitish beneath, upper edge whitish. Antennæ grey, pectinations 2½. Abdomen dark fuscous, segmental margins ochreous-whitish. Legs dark fuscous ringed with whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin rounded; fuscous, irregularly mixed with black and white; veins partially streaked with brownish-ochreous; a cloudy blackish line near base; a roundish dark spot in disc towards base, surrounded by a whitish suffusion; first line broad, white, blackish-margined, from ½ of costa to before middle of inner margin, gently curved, sinuate inwards above inner margin; a small transverse-oval blackish spot in disc above middle, placed on a dark bar joining first and second lines, and a

similar broader dark bar below middle; second line moderate, white, anteriorly black-margined, posteriorly ochreous-margined on lower half, from \(\frac{2}{3} \) of costa to \(\frac{3}{4} \) of inner margin, rather irregular, middle third forming a short bent curve outwards; subterminal slender, whitish, thrice sinuate, confluent beneath with a whitish irroration along hindmargin; a waved black hindmarginal line: cilia fuscous, mixed with darker, sharply barred with whitish. Hindwings with hindmargin rounded; pale whitish-fuscous, towards base slightly ochreous-tinged; a small fuscous discal spot; some white scales towards inner margin, and two white marks towards anal angle; an interrupted fuscous hindmarginal line; cilia whitish, basal half suffusedly barred with light fuscous.

Fremantle, West Australia; in October, one specimen.

38. Dichr. partitaria, Walk.

(Eubolia partitaria, Walk. Suppl. 1699; Liodes Angasi, Feld. pl. cxxxi. 13.)

₹Q. 18-21 mm. Head and thorax fuscous, irrorated with blackish and whitish, thorax in 3 with a fine ochreous median Palpi 21, rather dark fuscous, beneath ochreous-white towards base, upper edge mixed with white. Antennæ dark grey, obscurely spotted with whitish, pectinations 21. Abdomen dark grey irrorated with whitish. Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin rounded; fuscous, coarsely irrorated with black and more or less strongly with white; veins partially streaked with ferruginous-ochreous; an indistinct blackish line near base, not reaching inner margin; lines slender, white, obscurely blackish-margined; first from 1 of costa to middle of inner margin, gently curved, sinuate inwards above inner margin; second from ²/₃ of costa to ³/₄ of inner margin, slightly curved, slightly bent inwards on submedian fold; a small transverse-oval blackish spot in disc above middle; generally two ill-defined blackish streaks connecting first and second lines below middle; subterminal cloudy, whitish, rather strongly sinuate inwards above and below middle; a grey-whitish hindmarginal band, its anterior edge very 75

close and parallel to subterminal line, confluent with it towards anal angle; a fine waved black hindmarginal line: cilia fuscous, suffusedly irrorated with whitish, tending to form obscure bars. Hindwings with hindmargin rounded; fuscous-grey, somewhat darker posteriorly; an obscure darker discal dot; a faint paler line at $\frac{2}{3}$, sinuate in middle, becoming white and dark-margined on inner margin; a white dark-margined mark at anal angle; cilia fuscous, tips and base ochreous-whitish except towards apex.

Northampton and Albany, West Australia; in November and December, common.

39. Dichr. paratacta, n.sp.

3. 24 mm. Head and thorax blackish-fuscous. Palpi 2, dark fuscous, beneath ochreous-whitish. Antennæ dark grey, pectinations 3. (Abdomen broken.) Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin waved, rounded; rather light fuscous: basal area brownish-ochreous mixed with ferruginous, margins mixed with dark fuscous; a broad dark fuscous median band, anteriorly limited by a gently curved deep ferruginous, posteriorly blackish-edged streak from before \frac{1}{3} of costa to \frac{1}{3} of inner margin, posteriorly by second line, which is very fine, blackish, running from $\frac{2}{3}$ of costa to before $\frac{3}{4}$ of inner margin, forming an obtuse-angled projection below middle, above this slightly sinuate, below it waved; first line within this band near anterior edge, fine, blackish, irregular, angulated outwards beneath costa; a small transverse blackish spot in disc above middle, upper extremity connected with second line by a ferruginousochreous bar, lower extremity touching a similar bar extending from transverse ferruginous streak to second line in middle, posteriorly obscurely blackish-margined; space between median band and apex suffused with whitish-ochreous towards costa, especially anteriorly; subterminal line hardly paler, dark-margined, irregularly denticulate, anterior margin on upper 2 forming a moderately thick irregular partly fuscous and partly ochreousbrown shade, marked in middle with a short thick longitudinal black dash; hindmarginal area sprinkled with whitish; a waved black hindmarginal line; cilia light fuscous irregularly mixed with whitish. Hindwings with hindmargin rounded; fuscous; inner margin towards anal angle obscurely streaked transversely with whitish and darker fuscous; a dark fuscous hindmarginal line; cilia as in forewings.

Sydney, New South Wales; in October, two specimens. In the British Museum collection a specimen of this species is placed as *Coremia strumosata*, Gn., but this determination is wholly erroneous.

40. Dichr obtusata, Walk.

(Panagra obtusata, Walk. 1008; P. devitata, ib. 1010.)

39. 21-24 mm. Head and thorax fuscous sprinkled with whitish Palpi 21, dark fuscous, base whitish. Antennæ fuscous, pectinations $3\frac{1}{2}$. Abdomen whitish-fuscous, sprinkled with dark fuscous. Legs dark fuscous, femora and posterior tibiæ sprinkled with whitish. Forewings triangular, hindmargin bowed; fuscous, finely irrorated with whitish and thinly sprinkled with dark fuscous; a fine ferruginous line mixed with blackish near base, not reaching inner margin; a nearly straight well-marked ferruginous line from before \frac{1}{3} of costa to \frac{1}{3} of inner margin, becoming blackish at extremities; first and second lines fine, dark fuscous, irregularly dentate throughout, dilated on costa; first from 2 of costa to middle of inner margin; second from $\frac{2}{3}$ of costa to before $\frac{3}{4}$ of inner margin, slightly curved; a small transverse-oblong dark fuscous spot in disc above middle, sometimes only outlined in dark fuscous; three twice sinuate cloudy darker fuscous lines between second line and hindmargin, first sometimes mixed with ferruginous; a waved blackish hindmarginal line: cilia fuscous sprinkled with whitish. Hindwings with hindmargin rounded; fuscous, posteriorly irrorated with darker, tending to form cloudy lines towards inner margin; a dark fuscous hindmarginal line; cilia fuscous sprinkled with whitish.

Bathurst (2700 feet), New South Wales; Mount Lofty, South Australia; in November, six specimens.

41. Dichr. exsignata, Walk.

(Panagra exsignata, Walk. 1010.)

3. 22-24 mm. Head, palpi, and thorax wholly dark fuscous; palpi 21. Antennæ grey, pectinations 31. Abdomen pale fuscous irrorated with darker. Legs dark fuscous, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin bowed; fuscous, with a few blackish scales, somewhat darker on median band and along costa; an obscure slightly paler ferruginous-tinged nearly straight line from \(\frac{1}{3} \) of costa to \(\frac{2}{5} \) of inner margin, posteriorly more or less distinctly edged with blackish, especially towards inner margin; a small cloudy transverse dark fuscous spot in disc above middle; second line indicated by a very obscure sinuate series of pale dots preceded by blackish scales from ³/₄ of costa to ³/₄ of inner margin; subterminal hardly paler, very obscure, irregularly subdentate; hindmargin somewhat sprinkled with whitish; a waved blackish hindmarginal line: cilia fuscous, base sprinkled with whitish, terminal half whitish-fuscous. Hindwings with hindmargin rounded; füscous; a faint darker discal mark; a darker hindmarginal line; cilia as in forewings.

Sydney, New South Wales, from September to November; five specimens.

42. Dichr. liospoda, n.sp.

 \mathcal{J} . 23 mm. Head, palpi, and thorax dark ashy-fuscous; palpi $2\frac{1}{2}$, towards base white beneath. Antennæ dark fuscous, pectinations 3. Abdomen pale grey, suffusedly irrorated with dark grey. Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin bowed; dark ashy-fuscous; an obscure blackish line near base, not reaching inner margin; a nearly straight obscure blackish line from $\frac{1}{3}$ of costa to $\frac{2}{5}$ of inner margin; lines extremely obscure, hardly perceptibly darker, starting from cloudy blackish spots on costa at $\frac{2}{5}$ and $\frac{2}{3}$, second gently curved; a narrow obscure blackish transverse mark in disc above middle; subterminal very faintly indicated, not traceable; an interrupted blackish hindmarginal

line: cilia dark ashy-fuscous, with a few whitish points, towards tips paler. Hindwings with hindmargin rounded; rather dark fuscous; cilia rather dark fuscous.

Sydney, New South Wales; in September, one specimen.

43. Dichr. explanata, Walk.

(Panagra explanata, Walk. 1009.)

₹Q. 20-24 mm. Head and thorax dark grey irrorated with whitish and black. Palpi 3, dark grey irrorated with black, towards base white beneath, upper edge sprinkled with whitish. Antennæ grey, pectinations 5. Abdomen whitish-grey, suffusedly irrorated with dark grey. Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin bowed; fuscous, irrorated with black and white; lines whitish, obscurely darker-margined; first from 1/3 of costa to $\frac{2}{5}$ of inner margin, straight; second from before $\frac{3}{4}$ of costa to 3/4 of inner margin, moderately angulated outwards in middle, rather deeply sinuate inwards above middle and obtusely angulated inwards on submedian fold; a narrow transverse cloudy blackish spot in disc above middle; subterminal cloudy, whitish, very ill-defined, sinuate inwards above and below middle; a waved blackish hindmarginal line: cilià fuscous irrorated with blackish and whitish, terminal half fuscous-whitish obscurely barred with fuscous. Hindwings with hindmargin rounded; fuscous, rather darker posteriorly; a very faint paler sinuate line at 2; a dark fuscous hindmarginal line; cilia fuscous, tips whitish-fuscous.

Bathurst (2500 feet) and Sydney, New South Wales; Melbourne, Victoria; Albany, West Australia; in November, December, and March, rather common.

44. Dichr. sigmata, Walk.

(Panagra sigmata, Walk. 1005.)

Q. 21 mm. Forewings fuscous, irrorated with whitish and blackish; lines whitish, margined with blackish; first rather bent beneath costa, otherwise straight; second obtusely angulated in middle, sinuate inwards above middle and more deeply on lower

half; a moderately large narrow transverse blackish spot in disc above middle; subterminal whitish, anteriorly suffusedly margined with dark fuscous, rather irregular; a waved blackish hindmarginal line. Hindwings fuscous.

Said to be from Sydney, New South Wales. The above diagnosis is drawn from incomplete notes taken from the British Museum specimen, which is the only one I have seen; it appears to be a good species, allied to *D. explanata*.

45. Dichr. orthotis, n.sp.

3Q. 21-25 mm. Head and thorax dark fuscous, sprinkled with whitish, blackish, and ferruginous scales. Palpi about 3, dark fuscous, towards base white beneath, upper edge sprinkled with whitish. Antennæ grey, pectinations 5. Abdomen whitish-grey, suffusedly irrorated with dark grey. Legs blackish, apex of joints white, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin bowed; fuscous; basal area more or less mixed with ferruginous, and coarsely irrorated with black; first line straight, whitish, from \(\frac{1}{3} \) of costa to \(\frac{2}{5} \) of inner margin, anteriorly margined with deep ferruginous, posteriorly with three or four black dots; median area densely irrorated with whitish, less strongly on costa and inner margin, sometimes partially irrorated with black on veins; a moderate transverseoblong fuscous black-margined spot in disc above middle; second line almost straight, whitish, from before 3 of costa to 3 of inner margin, dilated on costa, anteriorly margined with black triangular dots, posteriorly with a ferruginous line; hindmarginal area irrorated with black, sometimes with traces of an irregular twice deeply sinuate whitish subterminal line, and a whitish irroration along hindmargin; veins near hindmargin sometimes marked with light ferruginous; a waved blackish hindmarginal line: cilia fuscous, irrorated with blackish and whitish, terminal half fuscous-whitish obscurely barred with fuscous. Hindwings with hindmargin rounded; fuscous; a faint paler slightly curved

line at $\frac{2}{3}$; some white scales towards inner margin; a darker hindmarginal line; cilia fuscous, terminal half fuscous-whitish.

Perth and Albany, West Australia; in November and December; five specimens. Generally, but not always, the contrast between the light median area and the dark basal and hindmarginal areas is very conspicuous.

46. Dichr. poecilotis, n.sp.

3Q. 21-24 mm. Head pale reddish-ochreous on crown, with a few dark fuscous and whitish scales, face whitish irrorated with dark fuscous. Palpi 21, dark fuscous, towards base white beneath, extreme apex white. Antennæ grey, pectinations 4. Thorax grey, mixed with light ochreous, and irrorated with whitish and a few blackish scales. Abdomen pale grey, sprinkled with dark grey. Legs grey, femora and posterior tibiæ sprinkled with whitish. Forewings triangular, hindmargin rounded, waved; fuscous, towards costa and on basal area sprinkled with whitish; veins, except costal branches, marked with rather thick light reddish-ochreous streaks, interrupted by lines; a blackish mark in disc near base; a curved cloudy blackish transverse line near beyond this; lines slender, whitish; first from 1 of costa to 2 of inner margin, posteriorly blackish-margined, acutely angulated outwards in middle, sinuate inwards above middle; second from about \(\frac{2}{3}\) of costa to \(\frac{2}{3}\) of inner margin, posteriorly blackishmargined, rather abruptly sinuate inwards above inner margin; a small transverse-oval blackish spot in disc above middle; a fine straight dark fuscous line near beyond second, interrupted by streaks on veins; subterminal formed by whitish irroration, posteriorly hardly defined, anteriorly sharply margined by a thick cloudy dark fuscous shade, deeply sinuate inwards above and below middle; a hindmarginal series of small blackish triangular subconfluent spots: cilia fuscous, irrorated with whitish. Hindwings with hindmargin rounded; fuscous; a faint darker median line; cilia light fuscous, tips more whitish.

Carnarvon and Geraldton, West Australia, in October and November; common.

47. Dichr. ioneura, n.sp.

3Q. 20-25 mm. Head pale reddish-ochreous, face grey-whitish sprinkled with blackish. Palpi 21, blackish-fuscous, towards base white beneath, upper edge sprinkled with white. Antennæ grey, pectinations 3. Thorax grey, sprinkled with whitish, and spotted with light reddish-ochreous. Abdomen pale grey, ochreous-tinged, sprinkled with dark grey. Legs dark grey, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin rounded; fuscous, densely irrorated with whitish; veins, except costal branches, marked with rather thick light reddish-ochreous streaks, interrupted by lines; a light reddish-ochreous transverse mark near base; a dark fuscous transverse line about 1, angulated beneath costa; first and second lines whitish on veins, but very obscure and interrupted; first from 1 of costa to 2 of inner margin, interruptedly margined posteriorly with dark fuscous, obtusely angulated outwards beneath costa; second from about 2 of costa to 2 of inner margin, interruptedly margined anteriorly with dark fuscous, somewhat irregular, sinuate inwards towards inner margin; a small transverse dark fuscous spot in disc above middle; a dark fuscous line beyond second, interrupted by streaks on veins, sinuate outwards in middle; subterminal only indicated by cloudy dark fuscous anterior margin, somewhat irregular, tending to be interrupted: cilia fuscous sprinkled with whitish, tips fuscous-whitish. Hindwings with hindmargin rounded; fuscous, somewhat darker posteriorly; cilia fuscous, tips fuscouswhitish.

Perth, West Australia, in October and November; rather common.

48. Dichr. steropias, n.sp.

3Q. 21-24 mm. Head and thorax fuscous irrorated with whitish, with a few dark fuscous scales. Palpi 4-6, grey, more or less mixed with whitish and dark fuscous. Antennæ grey, pectinations 4. Abdomen ochreous-whitish, more or less irrorated with grey. Legs dark fuscous, sprinkled with whitish, apex of joints whitish. Forewings elongate-triangular, hindmargin

rounded; fuscous, densely irrorated with whitish, and with scattered dark fuscous scales, more or less irregularly suffused in disc with whitish-ochreous; four small tufts of raised scales, blackish on anterior side, first beneath costa near base, second beneath costa at 1/4, third in disc before middle, fourth in disc above middle; lines slender, dark fuscous; first from 1/4 of costa to 1/3 of inner margin, irregular, acutely angulated outwards in middle, passing through second tuft, and angle terminating in third; second line from \$\frac{4}{5}\$ of costa to \$\frac{3}{4}\$ of inner margin, nearly straight, sharply dentate throughout; subterminal obscurely paler, subdentate, anteriorly margined by a straight cloudy dark fuscous shade running from apex to before anal angle; an interrupted black hindmarginal line: cilia fuscous, irrorated with whitish. Hindwings with hindmargin rounded; fuscous, sometimes paler and tinged with whitish-ochreous; an indistinct darker discal dot; a cloudy dark fuscous hindmarginal line; cilia light fuscous, sprinkled with whitish, sometimes whitish-ochreous.

Geraldton and Perth, West Australia, in November; three specimens. An eccentric species, specially characterised by the tufts on surface of forewings; the unusually long palpi are also unusually variable in length, and the same peculiarity may be observed in *D. consignata*.

49. Dichr. orectis, n.sp.

 $\Im Q$. 20-23 mm. Head and thorax pale ochreous or greyish, densely and suffusedly irrorated with whitish, sometimes with scattered blackish scales. Palpi $2\frac{1}{2}$, dark fuscous, towards base white beneath, upper edge sprinkled with white. Antennæ grey, pectinations 5. Abdomen pale greyish-ochreous, sprinkled with dark fuscous. Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin rounded; fuscous or light fuscous, densely irrorated with whitish and sprinkled with black; a blackish dot or transverse mark beneath costa near base; first line obscurely whitish, from before $\frac{1}{3}$ of costa to $\frac{2}{5}$ of inner margin, posteriorly margined with blackish, sometimes very thickly, nearly straight, slightly

indented in middle; a small transverse spot outlined with blackish in disc above middle; second line obscurely whitish, from \(\frac{3}{4} \) of inner margin, margined anteriorly with a series of small triangular blackish spots, sometimes confluent into a more or less thick black shade, rather sharply angulated outwards in middle, sinuate inwards above middle and more deeply on lower half, central angle marked with a small more or less distinct reddish-ochreous spot; subterminal cloudy, whitish, subdentate, rather irregular, anteriorly margined by a more or less distinct dark grey or blackish shade; a hindmarginal series of triangular black dots: cilia fuscous-whitish, with obscure fuscous bars, and a somewhat interrupted cloudy dark fuscous median line. Hindwings with hindmargin rounded; fuscous, posteriorly darker; a faint darker discal mark; cilia fuscous, terminal half fuscous-whitish.

Geraldton, West Australia; in November and December, common; a variable species. Larva 10-legged, cylindrical; bright green; spiracular line and segmental incisions pale yellowish, partly marked with white; a series of oblique white marks on sides meeting on back: feeds in November on a Myrtaceous shrub of which I failed to obtain the name, resembling *Leptospermum* in habit, with small diamond-shaped leaves crowded and appressed to stem in long shoots: pupa in a slight cocoon. The above larval description is incomplete; the larva is marked and coloured in beautiful imitation of the leafy stems of its food plant, the oblique white lateral lines expressing the outlines of the small crowded stem-clasping leaves.

50. Dichr. atrosignata, Walk.

(Panagra atrosignata, Walk. 1006; Eubolia linda, Butl. Ann. Mag. 1882, 96.)

3. 18-19 mm. Head and thorax dark fuscous. Palpi 3½, rather dark fuscous, upper edge sprinkled with whitish. Antennæ fuscous, pectinations 6. Abdomen whitish-fuscous irrorated with dark fuscous. Legs dark fuscous, femora and posterior tibiæ irrorated with whitish-ochreous. Forewings triangular, hind-

margin bowed; fuscous, suffusedly irrorated with whitish-fuscous and coarsely sprinkled with dark fuscous; lines obscurely paler; first from $\frac{1}{3}$ of costa to $\frac{2}{5}$ of inner margin, posteriorly margined with dark fuscous or sometimes strongly with blackish, hardly curved; second from beyond $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, anteriorly margined with dark fuscous or sometimes strongly with blackish, slightly irregular, slightly curved outwards on upper half and inwards on lower half; a small transverse dark fuscous sometimes paler-centred spot in disc above middle; subterminal hardly paler, subdentate, anteriorly suffusedly margined with darker fuscous; a hindmarginal row of triangular subconnected black dots: cilia pale whitish-fuscous, with a cloudy fuscous line. Hindwings with hindmargin rounded; fuscous; a faint darker discal dot; a faint curved paler line at $\frac{2}{3}$; an interrupted dark fuscous hindmarginal line; cilia as in forewings.

Q. 23-25 mm. Differs from $\vec{\sigma}$ as follows: forewings irrorated with whitish; lines broadly margined with blackish on discal side, except towards costa; discal spot very small or dot-like; second line from $\frac{3}{4}$ of costa, rather sharply angulated in middle, sinuate inwards above middle, and more strongly curved and somewhat bent inwards on lower half; cilia light fuscous irrorated with whitish.

Sydney, New South Wales; from August to October, and in March and April, common. The variability in the intensity of marking, and the sexual differences make this at first sight rather a perplexing species.

51. Dichr. euscia, n.sp.

3. 25 mm. Head and thorax dark fuscous, finely sprinkled with whitish. Palpi 3, dark fuscous, upper edge sprinkled with whitish. Antennæ grey, pectinations 3. Abdomen fuscous-whitish irrorated with dark fuscous. Legs dark fuscous, femora and posterior tibiæ sprinkled with whitish. Forewings triangular, hindmargin bowed; fuscous, densely irrorated with whitish and sprinkled with dark fuscous; a blackish dot on costa at $\frac{2}{5}$, a second in disc at $\frac{2}{5}$, and a third above inner margin at $\frac{1}{3}$; a small blackish

dot in disc above middle; second line hardly perceptibly paler, from $\frac{3}{4}$ of costa to $\frac{2}{3}$ of inner margin, anteriorly margined by a blackish dot on costa, and on lower $\frac{3}{4}$ by a thick black streak shading into fuscous anteriorly, obtusely angulated outwards in middle, slightly sinuate above middle, gently and evenly curved inwards on lower half; subterminal hardly paler, rather irregular, anteriorly suffusedly margined with darker: cilia fuscous, basal half irrorated with whitish, terminal half whitish-fuscous. Hindwings with hind margin rounded, apex somewhat prominent; fuscous, somewhat lighter towards base; cilia fuscous, towards tips whitish-fuscous.

Blackheath (3500 feet), New South Wales; in October and November, two specimens.

52. Dichr. ophiucha, n.sp.

 \Im . 21 mm. Head and thorax rather dark fuscous, finely irrorated with whitish. Palpi almost 4, fuscous irrorated with dark fuscous, upper edge sprinkled with whitish. Antennæ grey, pectinations 5. Abdomen whitish-fuscous. Legs dark fuscous sprinkled with whitish. Forewings triangular, hindmargin bowed; fuscous, finely irrorated with whitish; a short blackish mark beneath costa almost at base; a short outwardly oblique blackish streak from costa at $\frac{1}{3}$; a short longitudinal blackish streak in middle of disc; an obscure cloudy darker dot on costa at $\frac{3}{4}$: cilia fuscous sprinkled with whitish. Hindwings with hindmargin rounded; pale whitish-fuscous, slightly ochreous-tinged; cilia fuscous-whitish.

Sydney, New South Wales; in August and November, two specimens.

53. Dichr. indicataria, Walk.

(Eubolia indicataria, Walk. Suppl. 1698.)

32. 17-20 mm. Head and thorax rather dark fuscous, finely and densely irrorated with whitish. Palpi 2½, dark fuscous, upper edge sprinkled with white. Antennæ grey, pectinations 4. Abdomen ochreous-grey-whitish, irrorated with dark grey. Legs dark fuscous, finely sprinkled with whitish. Forewings triangular,

hindmargin rounded, waved; fuscous, finely and densely irrorated with whitish; lines slightly paler; first from $\frac{2}{5}$ of costa to $\frac{2}{5}$ of inner margin, posteriorly finely dark-margined, sometimes with blackish, nearly straight, rather irregular; second from $\frac{2}{3}$ of costa to $\frac{2}{5}$ of inner margin, anteriorly finely margined with darker or sometimes with blackish, very slightly curved outwards on upper $\frac{2}{3}$, shortly dentate throughout; included median space sometimes suffused with dark fuscous, without whitish irroration; a fine blackish small transverse-oval ring in disc above middle; subterminal hardly paler, posteriorly faintly, anteriorly more distinctly dark-margined, twice slightly sinuate; a blackish waved hindmarginal line: cilia fuscous irrorated with whitish, with obscure indications of darker fuscous bars. Hindwings with hindmargin rounded; fuscous; a faint darker discal dot; cilia fuscous, with a cloudy darker median line, base and tips sprinkled with whitish.

Melbourne, Victoria; Geraldton and Perth, West Australia; from October to December, common.

54. Dichr. molybdaria, Gn.

(Panagra molybdaria, Gn. X. 131; P. carbonata, Walk. 1004.) 32. 20-25 mm. Head and thorax dark fuscous irrorated with whitish. Forewings fuscous, irrorated with whitish, thinly sprinkled with black; lines dark fuscous; first somewhat irregular, from before middle of costa to before middle of inner margin, sinuate outwards beneath costa; second markedly denticulate throughout, from before \(\frac{3}{4}\) of costa to before \(\frac{3}{4}\) of inner margin, somewhat curved outwards and more dentate on central third, marked with a more or less distinct reddish-ochreous spot in middle; included median space often suffused with dark slaty-grey except on costa, but in paler specimens a dark grey discal dot visible; subterminal slightly paler, waved, preceded by a slightly darker shade; a widely interrupted fine blackish hindmarginal line; cilia pale grey. Hindwings fuscous-grey or light grey.

Said to be from Sydney, New South Wales; five specimens

Said to be from Sydney, New South Wales; five specimens in British Museum Collection, from which this diagnosis is taken, as I have seen no others.

55. Dichr. estigmaria, Walk.

(Panagra estigmaria, Walk. 1001; P. costinotata, ib. 1001, Acidalia schistacearia, ib. 1609.)

3Q. 22-24 mm. Head and thorax greyish-ochreous irrorated with whitish. Palpi 21/2, brownish-ochreous, upper edge sprinkled with white, extreme tip white. Antennæ light ochreous spotted with whitish, pectinations 7. Abdomen whitish-ochreous sprinkled with dark fuscous. Legs light brownish-ochreous, posterior tibiæ in A dilated, enclosing tuft of hair of hairs in groove, posterior tarsi in 3 less than half tibiæ. Forewings triangular, hindmargin bowed; light brownish-ochreous, greyish-ochreous, or pale fuscous, finely irrorated with ochreous-whitish; lines hardly perceptibly paler; first from before middle of costa to before middle of inner margin, angulated immediately beneath costa, where it is margined posteriorly by one or two blackish dots, and sinuate inwards in middle and above inner margin, with a blackish dot on posterior margin in each sinuation; a fuscous dot in disc above middle; second line from $\frac{3}{4}$ of costa to before $\frac{3}{4}$ of inner margin, hardly curved, sinuate inwards above and below middle, with a slight bidentate projection outwards in middle, anteriorly margined with indistinct sometimes subconnected blackish dots, sometimes with a small blackish or partly ferruginous spot on median projection; subterminal hardly perceptibly paler, anteriorly margined by a more or less faint obscure interrupted darker shade, sometimes forming a small cloudy dark fuscous spot on costa; a widely interrupted black hindmarginal line or series of triangular dots: cilia light fuscous sprinkled with yellowwhitish, terminal half fuscous-whitish. Hindwings with hindmargin rounded; pale fuscous, sometimes ochreous-tinged; cilia whitish-fuscous, tips paler.

Sydney and Blackheath (3500 feet), New South Wales; from October to December, and in February, common. The abbreviated posterior tarsi of the 3 are a notable special characteristic.

56. Dichr. ornata, Walk.

(Panagra ornata, Walk. 1004.)

39. 20-21 mm. Head and thorax dark ashy-fuscous. Palpi 21, dark fuscous, upper edge sprinkled with whitish. Antennæ grey, pectinations 6. Abdomen whitish-grey, irrorated with dark grey. Legs dark fuscous, femora sprinkled with whitish. Forewings triangular, hindmargin bowed; fuscous, finely irrorated with whitish and sprinkled with dark fuscous; a hardly curved series of four blackish dots from 2 of costa to 5 of inner margin; an obscure dark fuscous dot in disc above middle; second line hardly perceptibly paler, from 4 of costa to 3 of inner margin, nearly straight, gently sinuate outwards below costa and in middle, anteriorly edged with a series of blackish dots or sometimes with a thick anteriorly suffused dark fuscous shade; a faint paler subdentate subterminal line, very obscurely edged with darker anteriorly; an interrupted black hindmarginal line: cilia fuscous, sprinkled with whitish. Hindwings with hindmargin rounded; fuscous; a faint paler anteriorly darker-edged sinuate line beyond middle, more distinct towards inner margin; a dark fuscous hindmarginal line; cilia fuscous, sprinkled with whitish.

Sydney and Blackheath (3500 feet), New South Wales; from September to November, and in March, common.

57. Dichr. ischnota, n.sp.

Q. 18-19 mm. Head and thorax fuscous, densely irrorated with whitish. Palpi 3, ochreous-fuscous, towards base white beneath, upper edge sprinkled with white, extreme apex white. Antennæ grey spotted with whitish. Abdomen whitish sprinkled with dark fuscous. Legs fuscous sprinkled with whitish. Forewings rather elongate-triangular, hindmargin bowed; fuscous, densely irrorated with whitish and less densely with dark fuscous; lines very obscurely whitish; first from before middle of costa to before middle of inner margin, sharply angulated outwards beneath costa, posteriorly more or less distinctly edged with dark fuscous; second from $\frac{4}{5}$ of costa to $\frac{3}{4}$ of inner margin, slightly sinuate

inwards above middle and more strongly on lower half, anteriorly more or less distinctly margined with dark fuscous; included median space with lower half sometimes ochreous-fuscous mixed with blackish, without white irroration; an obscure whitish subdentate twice sinuate subterminal line, anteriorly suffusedly margined with dark fuscous; an interrupted blackish hindmarginal line: cilia fuscous, sprinkled with whitish. Hindwings with hindmargin rounded; fuscous; a faint paler sinuate line at $\frac{2}{3}$; an interrupted dark fuscous hindmarginal line; cilia fuscous, sprinkled with whitish.

Carnarvon, West Australia, in October; two specimens.

58. Dichr. triparata, Walk.

[Panagra triparata, Walk. 1005; P. molybdaria, ib. 995 (nec Gn.).]

39. 20-22 mm. Head and thorax dark ashy-fuscous with a few blackish scales. Palpi 31, dark fuscous, base slightly sprinkled with whitish. Antennæ grey, pectinations 31. Abdomen whitish-fuscous, suffusedly irrorated with dark grey. Legs dark fuscous, apex of joints whitish, femora and posterior tibiæ irrorated with whitish. Forewings triangular, hindmargin waved, bowed; fuscous, finely irrorated with whitish and sprinkled with dark fuscous; three nearly straight cloudy indistinct dark fuscous lines between base and first line, central one broad, other two very slender; first and second lines cloudy, blackish, less marked towards costa; first from before middle of costa to middle of inner margin, straight; second from 2 of costa to before 2 of inner margin, forming a short angular projection in middle, slightly sinuate inwards above and more strongly below this; included median space almost without whitish irroration, forming a narrow dark band, on lower half sometimes suffused with blackish; a blackish linear transverse mark in disc above middle; a slender cloudy dark fuscous line near beyond and parallel to second line, more sinuate outwards beneath costa, marked with a cloudy ochreous spot in middle; subterminal slender, obscure, whitish, rather irregular, margined by suffused darker shades; an obscure

brownish-ochreous suboblique dash from hindmargin beneath apex, appearing to enclose with subterminal line a more whitish diamond-shaped apical spot; a waved black hindmarginal line: cilia fuscous, basal half sprinkled with whitish, tips whitish. Hindwings with hindmargin rounded; fuscous, towards hindmargin rather darker; three short whitish dark-margined streaks from inner margin above anal angle; a dark fuscous hindmarginal line; cilia fuscous, with some whitish points.

Sydney, New South Wales; Melbourne, Victoria; Albany, West Australia; from August to December, common.

59. Dichr. consignata, Walk.

(Panagra consignata, Walk. 1006; P. petrilineata, ib. 1008.) 39. 22-25 mm. Head and thorax dark fuscous densely irrorated with white. Palpi 31-5, fuscous irrorated with dark fuscous. upper and lower margins irrorated with white. Antennæ grev, pectinations 41. Abdomen pale whitish-fuscous, with a few dark fuscous scales. Legs dark fuscous irrorated with white. Forewings triangular, hindmargin bowed; fuscous, very densely irrorated with white, and with scattered dark fuscous scales; lines moderately broad, obscurely whitish, margined on both sides with dark fuscous; first from before middle of costa to before middle of inner margin, slightly sinuate outwards on upper half and inwards on lower half, margins more or less strongly thickened on lower half; second from 5 of costa to 3 of inner margin, sinuate inwards above middle and again below middle; a small narrow transverse blackish spot in disc above middle; subterminal obscurely whitish. terminating above in apex, more or less strongly sinuate outwards in middle, anteriorly rather strongly margined and sinuation filled with blackish, separated from second line by a light ochreous shade becoming whitish towards costa, posteriorly suffusedly margined with dark fuscous; a waved black hindmarginal line: cilia fuscous, densely irrorated with white, tips more or less white. Hindwings with hindmargin slightly rounded, apex somewhat prominent; light fuscous; an obscure darker discal dot; some-

76

times a faint paler line at $\frac{2}{3}$; a dark fuscous hindmarginal line; cilia fuscous, base paler, terminal half sprinkled with whitish.

Bathurst (2500 feet), New South Wales; Perth and Albany, West Australia; from October to December, common.

60. Dichr. stilbiata, Gn.

(Liodes stilbiata, Gn. X. 120, pl. xvIII. 4; Panagra plusiata, Walk. 1007.)

₹Q. 23-28 mm. Head and thorax dark fuscous, more or less sprinkled with whitish. Palpi 2, dark fuscous, upper edge sprinkled with whitish. Antennæ grey, pectinations 5. Abdomen pale whitish-fuscous, sprinkled with fuscous. Legs dark fuscous, femora irrorated with whitish, posterior tibiæ in 3 with tuft of hairs enclosed in groove. Forewings triangular, hindmargin rounded; rather dark fuscous, densely irrorated with white on basal area and more or less partially in disc and posteriorly, except towards costa; veins partially and irregularly marked with black in disc and posteriorly; a cloudy dark fuscous transverse mark at 1,50 not reaching margins; first line obscurely whitish, from before middle of costa to 2 of inner margin, angulated outwards beneath costa but generally indistinct, posteriorly margined on lower half with blackish; a small narrow transverse blackish spot in disc above middle; base of veins 3 and 4 forming a small triangular black spot before second line; second line cloudy, white, broader towards costa, from 5 of costa to 3 of inner margin, bent-sinuate inwards above inner margin, anteriorly irregular - edged, posteriorly separated by a fine dark fuscous line from a cloudy parallel fine indistinct whitish line; subterminal indistinct, cloudy, whitish, subdentate, terminating above in apex, abruptly sinuate outwards below middle; hindmargin suffused with whitish; a waved black hindmarginal line: cilia whitish barred with fuscous, with an illdefined fuscous median line. Hindwings with hindmargin rounded; fuscous; a faint darker discal dot; a very faint paler line at $\frac{2}{3}$; a dark fuscous hindmarginal line; cilia as in forewings, but fuscous-tinged and more obscure.

Sydney, Blackheath (3500 feet), and Mount Kosciusko (5000 feet), New South Wales; Melbourne, Victoria; Deloraine and Hobart, Tasmania; Mount Lofty, South Australia; from October to February, common.

61. Dichr. confluaria, Gn.

(Panagra confluaria, Gn. X. 131, pl. VII. 8.)

₹Q, 24-32 mm. Head dark fuscous irrorated with white. Palpi 31, dark fuscous, towards base white beneath, upper edge white. Antennæ grey, pectinations 6. Thorax dark fuscous, shoulders and a posterior spot whitish. Abdomen whitish-ochreous, more or less sprinkled with dark fuscous. Legs dark fuscous, femora sprinkled with whitish. Forewings triangular, hindmargin rounded; dark fuscous; a cloudy white streak beneath costa from base, reaching costa before apex; first line white, from before middle of costa to 1 of inner margin, very acutely angulated outwards on subcostal streak, so as to reach 3, upper portion slender, lower broad and containing a central cloudy ochreous line, rather sinuate inwards above inner margin; second line from 5 of costa to 4 of inner margin, fuscous-ochreous, margined on both sides with white throughout, slightly angulated outwards above middle, thence to inner margin moderately curved inwards; subterminal nearly straight, cloudy, white; a white streak along hindmargin from apex to anal angle; a black hindmarginal line: cilia fuscous, basal half sometimes sprinkled with whitish, terminal half whitish with faint fuscous bars. Hindwings with hindmargin slightly rounded, apex rather prominent; pale fuscous; an obscure darker discal dot; a faint paler anteriorly darker-edged line at $\frac{2}{3}$, and traces of two extremely faint similar lines between this and hindmargin; a dark fuscous hindmarginal line; cilia as in forewings.

Blackheath (3500 feet), New South Wales; Melbourne, Victoria; Deloraine, Tasmania; Albany, West Australia; from October to December, common.

62. Dichr. personalis, Feld.

(Colobochila personalis, Feld. pl. cxx. 20.)

30. 24-29 mm. Head whitish or whitish-fuscous. Palpi 2½-3, dark fuscous, upper edge white. Antennæ grey-whitish, pectinations 5. Thorax white, collar and patagia fuscous-tinged, apex and inner side of patagia blackish. Abdomen fuscous-whitish, sprinkled with dark fuscous. Legs fuscous, femora and posterior tibiæ dark fuscous irrorated with paler, posterior tibiæ of 3 dilated, enclosing tuft of hairs in groove. Forewings somewhat elongate-triangular, hindmargin slightly rounded; pale whitishfuscous, with a few scattered dark fuscous scales; dark markings margined with whitish-ochreous; a slender cloudy dark fuscous streak along costa throughout; a rather large elongate-triangular blackish spot in middle of disc; a broad blackish subdorsal streak from base of inner margin to anal angle, lower edge straight, leaving a narrow dorsal streak of groundcolour, upper edge with a broad triangular projection before middle, and posteriorly triangularly dilated to coalesce with a narrow subterminal fascia from near apex, of which the anterior edge is slightly sinuate, posterior edge triangularly dilated in middle, upper extremity attenuated; a fine dark fuscous hindmarginal line: cilia grey-whitish, with a cloudy fuscous line. Hindwings with hindmargin slightly rounded, apex somewhat prominent; fuscous; a darker discal dot; a sinuate obscurely darker posterior line; cilia fuscous.

Perth and Albany, West Australia, in November and December; in swampy thickets, common.

7. Oenone, n.g.

Face clothed with long fine erect hairs. Tongue developed. Antennæ in \eth filiform, simple. Palpi moderate, subascending, rather slender, with appressed scales, clothed with long fine projecting hairs. Thorax with fine erect hairs above, densely hairy beneath. Forewings with vein 10 connected by bar with 9. Hindwings with veins 6 and 7 approximated at base or short-stalked.

Doubtless an early type, having near relationship to *Dichromodes* on the one hand and the European genus *Brephos* on the other. It would appear to have been brought into close competition with the ancestors of *Dichromodes*, and to have been worsted, surviving only in the mountains of Tasmania. Similarly *Brephos* has only maintained itself in Europe by becoming adapted to the wintry climate of the earliest spring.

63. Oen. solaris, n.sp.

3. 23 mm. Head blackish, face and sides whitish. Palpi whitish, mixed with blackish hairs. Antennæ blackish, Thorax and abdomen blackish, with a few white scales on segmental margins. Legs dark fuscous, apex of joints whitish. Forewings elongate-triangular, costa slightly sinuate, hindmargin rounded; ochreous-fuscous, densely and suffusedly irrorated with blackishfuscous; several short longitudinal pale yellowish marks in disc towards base; first line thick, cloudy, blackish-fuscous, from 1 of costa to before middle of inner margin, somewhat curved; an obscure whitish dot in disc, suffusedly margined with darker; second line whitish, becoming fuscous-tinged beneath, suffusedly dark-margined, from $\frac{3}{4}$ of costa to $\frac{3}{4}$ of inner, margin, waved, slightly outwards-curved, slightly sinuate near inner margin; an irregular fine subterminal line indicated by whitish scales: cilia fuscous mixed with dark fuscous (imperfect). Hindwings with hindmargin rounded; bright deep reddish-orange; some blackish scales towards costa; a narrow blackish band from apex along hindmargin to anal angle, where it is extremely slender, thence along inner margin to base where it is suffusedly dilated; cilia whitish-fuscous mixed with blackish.

Mount Wellington (3500 feet), Tasmania, in December; one specimen.

64. Oen. lunaris, n.sp.

3. 21-23 mm. Head blackish, with some yellow-whitish scales, face yellow-whitish. Palpi whitish, mixed with blackish hairs.

Antennæ blackish. Thorax blackish, patagia and posterior margin sprinkled with pale ferruginous. Abdomen blackish, segmental margins with some white scales. Legs dark fuscous. Forewings elongate-triangular, costa slightly sinuate, hindmargin rounded; dark fuscous mixed with blackish, and sprinkled with pale ferruginous; lines obscure, formed by a whitish irroration; first from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin, posteriorly suffusedly darkmargined, moderately curved; second from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, anteriorly suffusedly dark-margined, rather irregular, somewhat sinuate outwards in middle and inwards above inner margin; subterminal irregular, preceded by a darker suffusion: cilia dark fuscous, with indistinct bars formed by a whitish irroration. Hindwings with hindmargin rounded; rather dark fuscous; a large cloudy white somewhat trapezoidal blotch occupying whole of disc; cilia rather dark fuscous; tips whitish.

Mount Wellington (4100 feet), Tasmania; common, flying freely over the rocky ground on the extreme summit, in December.

8. ASPILATES, Tr.

Face smooth. Tongue developed. Antennæ in δ bipectinated throughout. Palpi moderate, porrected, shortly rough-scaled or with rather appressed scales. Thorax sometimes hairy beneath. Forewings with vein 10 anastomosing or connected by bar with 9 or separate. Hindwings with veins 6 and 7 stalked or approximated at base.

The species referred by Lederer to this genus are heterogeneous in character, some of them not even belonging to this family; I have restricted the genus to those whose structure is as above. It then consists only of some half dozen European and Asiatic species, representing perhaps the fragments of a formerly more numerous group.

65. Asp. chordota, n.sp.

3. 32 mm. Head dark fuscous. Palpi white, externally dark fuscous except on basal joint. Antennæ white. Thorax hairy beneath, dark fuscous, anterior margin, and inner margin of

patagia white. Abdomen whitish. Legs dark fuscous, posterior tibiæ white. Forewings very elongate-triangular, hindmargin rather obliquely rounded, somewhat waved; 10 connected with 9 by bar; dark fuscous, ochreous-tinged; all veins and submedian fold marked with rather strong white lines; an indistinct transverse whitish line rather near and parallel to hindmargin: cilia white. Hindwings with hindmargin somewhat bent on vein 3, anal angle rather prominent; 6 and 7 approximated at base; whitish; a crescentic grey discal spot; a moderate hindmarginal band slightly fuscous-tinged; a fuscous hindmarginal line; cilia white.

Melbourne, Victoria; one specimen (Coll. Lucas). A very distinct and interesting species.

9. EUMELEA, Jard.

Face with slight projection of scales. Tongue developed. Antennæ long ($^{5}_{6}$ or almost 1), in \circlearrowleft filiform, simple. Palpi moderately long, ascending, second joint rough-scaled, terminal joint rather slender, cylindrical, porrected. Thorax, femora, and posterior tibiæ hairy beneath. Forewings with vein 11 anastomosing first with 12 and then strongly with 10. Hindwings with veins 6 and 7 stalked.

A small Indo-Malayan genus, of which one wide-ranging species extends into the tropical regions of Australia. The slenderness and length of the legs and antennæ give it an abnormal appearance in this group. It may probably be regarded as a special development from the neighbourhood of Aspilates; I have an undescribed closely allied genus from Burmah which possesses unipectinated antennæ in the 3.

66. Eum. rosalia, Cr.

(Eumelea rosalia, Cr., Gn. IX. 392.)

3. 48-54 mm. Head yellow, spotted with crimson-red. Palpi crimson, beneath yellow. Antennæ whitish-ochreous, becoming crimson towards base. Thorax light yellow, anterior margin crimson. Abdomen light yellow, suffusedly irrorated with light

crimson. Legs pale yellowish, femora and tibiæ partly crimson. Forewings somewhat elongate-triangular, hindmargin slightly rounded; light yellow, densely strewn with short suffused ferruginous-orange sometimes crimson-tinged transverse strigulæ; the yellow colour often forms a small clear spot at apex, and sometimes others above and below disc beyond middle, and in middle of hindmargin; costa finely strigulated with dark purplish-fuscous, on basal fourth suffused with purplish; a curved transverse purplish-crimson streak from 1/4 of costa to before 1/5 of inner margin, sometimes nearly obsolete; a slightly curved transverse purplish-crimson streak from beyond middle of costa to beyond middle of inner margin; a more or less perceptible variable purplish-crimson subterminal fascia: cilia purplishcrimson, sometimes marked with yellow dots. Hindwings with hindmargin waved, rounded; colour and markings as in forewings, but costal strigulæ and first transverse streak absent; second transverse streak central, straight.

Townsville and Cairns, Queensland; three specimens. Also from New Guinea, the Solomon Islands, and Ceylon.

10. Xenomusa, n.g.

Face smooth. Tongue developed. Antennæ in 3—? Palpi very short, porrected, rough-scaled. Forewings with vein 10 out of 9. Hindwings with veins 6 and 7 approximated at base, 8 fused with cell at a point near base.

The \mathcal{J} is unfortunately unknown; I suspect, however, that the antennæ may be unipectinated. The genus is peculiar, but affords a valuable connecting link between the preceding and following groups.

67. Xen. monoda, n.sp.

Q. 41 mm. Head, palpi, antennæ, thorax, abdomen, and legs whitish-ochreous; forehead with an irregular blackish bar, face white; antennæ partially dotted with fuscous; legs ringed with dark fuscous. Forewings somewhat elongate-triangular, costa

sinuate, apex acute, subfalcate, hindmargin deeply sinuate beneath apex, thence bowed; whitish-ochreous, slightly brownish-tinged, strewn with short scattered dark grey transverse strigulæ; a straight cloudy grey streak, somewhat mixed with ochreous, from apex to middle of inner margin, broadest beneath, interrupted near upper extremity, thence to near inner margin marked with a fine cloudy blackish line: cilia rather dark fuscous, tips fuscous-whitish. Hindwings with hindmargin rounded; colour, strigulæ, and cilia as in forewings, but base paler; a straight cloudy fuscous streak, mixed with ochreous and a few blackish scales, from middle of costa to middle of inner margin, posteriorly suffusedly margined with yellow-ochreous, especially towards middle; beyond this suffusion a moderate roundish cloudy fuscous spot in disc above middle, beneath which is an obscure pale dot.

Melbourne, Victoria; one specimen received from Dr. T. P. Lucas, who possesses others.

11. ONYCHODES, Gn.

Face smooth. Tongue developed. Antennæ in 3 bipectinated to apex, in Q also very shortly bipectinated. Palpi short, porrected, rough-scaled. Thorax densely hairy beneath. Forewings with vein 11 anastomosing with 12. Hindwings with veins 6 and 7 somewhat approximated at base.

These characters are drawn from O. lutosaria, as I have not been able to examine a specimen of O. traumataria, which is the type of Guénée's genus; the definition may therefore require modification, or it may even prove that the two species cannot be justly included together. So far as the structural characters are given by Guénée, they appear to agree. I have corrected the erroneous spelling of Guénée's generic name.

68. Onych. traumataria, Gn.

(Onycodes traumataria, Gn. IX. 143, pl. IX. 8.)

3Q. 35-40 mm. Forewings with costa somewhat concave, apex strongly produced, hindmargin concave beneath apex, bowed; hindwings with hindmargin rounded. Wings rosy-fulvous, cilia reddish-brown or purplish; hindwings suffused with ochreous-yellow on costal half. A median series of more or less distinct dull red spots crosses all the wings, and often forms a narrow fascia on hindwings, which are strewn with longitudinal (?) striæ of the same colour. Forewings with an apical spot mixed with brown, reddish, and white; a similar spot near anal angle, and an obscure costal streak preceding apical spot. The Q is more rosy and less yellow, the apical spot sometimes forming the commencement of a dentate line.

Hobart, Tasmania; I have seen a specimen taken by Mr. G. F. Mathew, but unfortunately omitted to describe it at the time. The above description is translated from Guénée, only altering the terminology so far as to make it correspond sufficiently with that used by myself; it is, however, poor and confused. His figure, though not very good, is characteristic, and for the rest the species is easily enough recognisable.

69. Onych. lutosaria, Feld.

(Arhodia lutosaria, Feld. pl. CXXIV. 15-17.)

Q. 60 mm. Head dark ochreous-fuscous, with a white band above palpi, and a broad whitish-rosy band between antennæ. Palpi rosy, base ochreous-yellow. Antennæ whitish, towards base rosy. Thorax yellow-ochreous, with a rosy spot on shoulders. Abdomen yellow, irrorated with rosy, base more whitish, apex and a dorsal series of pairs of spots rosy. Legs yellow spotted with rosy. Forewings elongate-triangular, costa sinuate, apex acute, strongly produced, hindmargin deeply concave beneath apex, strongly bowed, very oblique beneath; light yellow-ochreous, brownishtinged, with a few scattered purplish dots; a dark purplish-

fuscous suffusion along basal fifth of costa; three dark purplishfuscous oblique transverse spots on costa at $\frac{1}{5}$, $\frac{2}{5}$ and $\frac{2}{3}$, and three similar spots on inner margin at $\frac{1}{3}$, $\frac{1}{2}$, and $\frac{2}{3}$; a small dark purplish-fuscous discal spot beyond middle; an oblique dark fuscous streak from apex, suffused above with rosy, and towards apex beneath with a dark grey cloud, with a series of three small dark purplish-fuscous spots between its extremity and third dorsal spot; four dull rosy spots in a transverse series above anal angle, and two others towards hindmargin above middle: cilia rosy. Hindwings with hindmargin rounded; yellow, thinly speckled with rosy; a small round rosy discal spot; inner margin obscurely strigulated with white and black; a short irregular white transverse streak from inner margin at 2, speckled and margined with black, followed beneath by a broad dull fuscous-rosy patch, connected with costa by a double series of rosy dots; cilia yellow, on lower half of hindmargin deep rosy.

& smaller, forewings more brownish or rosy-tinged, more uniform; no dorsal spots, discal spot, or subapical streak; markings reduced to costal spots, and two transverse dotted lines.

Fernshaw, Victoria; two specimens (Coll. Lucas). Felder's figures are in this instance good.

12. ARRHODIA, Gn.

Face densely scaled. Tongue developed. Antennæ in $\mathfrak F$ bipectinated to apex. Palpi moderate, subascending, second joint rather shortly rough-scaled, terminal joint short. Thorax stout, densely hairy beneath. Anterior tibiæ with subapical hook, posterior tibiæ without middle-spurs, tarsi not spinulose. Forewings with vein 6 from close below 9, 10 free. Hindwings with veins 6 and 7 approximated at base.

Perhaps a development of *Gastrophora*; this and the next four genera form a closely allied group of singular facies and unusually stout build. The generic name is misspelt by Guénée *Arhodia*, which I have corrected.

70. Arrh. lasiocamparia, Gn.

(Arhodia lasiocamparia, Gn. IX. 186; A. retractaria, Walk. 282; Nigasa subpurpurea, ib. 287; Arhodia semirosea, ib., Trans. Ent. Soc. Lond. I. (3 s.), 267.)

30. 50-62 mm. Head and thorax pale brownish-ochreous, in Q more whitish. Palpi whitish. Antennæ whitish, pectinations light ochreous. Abdomen ochreous-whitish, in 3 more ochreous on back. Legs light ochreous, posterior tibiæ ochreous-whitish, tarsi slightly rosy-tinged. Forewings triangular, in Q more elongate, hindmargin nearly straight, oblique, slightly sinuate near apex; pale brownish-ochreous, in Q sprinkled with dark purplefuscous scales; a small cloudy fuscous spot on inner margin beyond middle; a sinuate series of dark purplish dots from 5 of costa to 3 of inner margin, in 3 indistinct or obsolete: cilia fuscous, at apex and anal angle whitish-ochreous. Hindwings with hindmargin rounded; in 3 dull reddish or purplish, in Q ochreous-whitish, more ochreous-tinged posteriorly and with fine scattered purplish scales; a slightly curved and sinuate cloudy purplish-fuscous line at $\frac{2}{3}$; sometimes a dark fuscous dot in disc before this; cilia ochreous-whitish, in 3 rosy-tinged. Forewings beneath with a large deep purple-fuscous blotch in disc towards hindmargin.

Sydney, New South Wales; Melbourne and Warragul, Victoria; Mount Lofty, South Australia; six specimens.

13. Gastrophora, Gn.

Face loosely haired. Tongue developed. Antennæ in 3 strongly bipectinated to apex. Palpi rather short, densely scaled, terminal joint short, thick. Thorax stout, densely hairy beneath. Tarsi not spinulose. Forewings with veins 6 out of 9, 10 connected with 9 by bar. Hindwings with veins 6 and 7 stalked.

Probably a development of Monoctenia.

71. Gastr. henricaria, Gn.

(Gastrophora henricaria, Gn. IX, 187, pl. xxi, 4).

3. 65 mm. Head white, face grey-whitish, forehead with a thick black transverse line. Palpi white, upper longitudinal half

black. Antennæ and thorax whitish. Abdomen whitish, sometimes purple-blackish on back. Legs white, speckled with black, anterior pair blackish. Forewings elongate-triangular, costa gently arched, hindmargin almost straight, oblique; very pale whitishgrey, slightly ochreous-tinged, or whitish-ochreous; sometimes a black dot near inner margin at 2; a nearly straight strong black line from beyond middle of costa to beyond middle of inner margin: cilia blackish. Hindwings with hindmargin rounded; deep orange; a purplish-black basal patch, outer edge irregular, running from costa towards base to 2/3 of inner margin; a thick black rather irregular streak from $\frac{2}{3}$ of costa to $\frac{2}{3}$ of inner margin; a tolerably parallel row of small black spots midway between this and hindmargin; cilia whitish. Undersurface pale whitish-grey; forewings with disc orange, and a very large posterior black blotch, containing towards its upper anterior angle two superposed cloudy violet-bluish spots, each including anteriorly a white transverse mark.

Q. 85 mm. Forewings with hindmargin sinuate, with small fine scattered dark grey strigulæ; black line absent; two cloudy fuscous lines, first median, somewhat curved, second at $\frac{3}{4}$, nearly straight.

Melbourne, Victoria; Mount Lofty, South Australia; three specimens.

14. PHALLARIA, Gn.

Face with dense scales. Tongue developed. Antennæ in & bipectinated to apex. Palpi moderate, subascending, second joint clothed with dense projecting scales, terminal joint moderate, cylindrical. Thorax stout, densely hairy beneath. Anterior tibiæ with small apical spine, all tarsi spinulose. Forewings with vein 10 connected with 9 by bar. Hindwings with veins 6 and 7 approximated at base.

A development of Monoctenia.

72. Phall. ophiusaria, Gn.

(Phallaria ophiusaria, Gn. IX, 186; Oenochroma quaternaria, HS. Exot. 541.)

39. 62-75 mm. Head fuscous, with a broad white fillet between antennæ. Palpi whitish-fuscous. Antennæ whitish, pectinations Thorax fuscous, posteriorly more whitish-fuscous. Abdomen whitish-fuscous. Legs whitish-fuscous spotted with dark fuscous. Forewings rather elongate-triangular, hindmargin slightly sinuate beneath apex, thence strongly bowed; fuscous, strewn with numerous small darker transverse strigulæ, sometimes tinged with reddish-brown; costal edge sometimes very narrowly white; three or four small cloudy darker spots forming a curved series at 1; a short transverse linear transparent whitish mark in disc, margined with blackish; an indistinct straight slender fuscouswhitish streak from beyond middle of inner margin towards apex but not quite reaching it, posteriorly obscurely margined with darker and with a series of cloudy dark fuscous dots, sometimes followed by a reddish-brown streak: cilia reddish-brown, terminal third blackish. Hindwings with hindmargin waved, rounded; colour and cilia as in forewings; a straight transverse streak as in forewings, but running from middle of costa to middle of inner margin.

Sydney and Bathurst (2500 feet), New South Wales; Warragul, Victoria; Mount Lofty, South Australia; four specimens. I once possessed, but failed to rear, what I have been told was the larva of this species; a large 12-legged dull brown larva, feeding on Leptospermum and Kunzea; it was exceedingly sluggish in habit.

15. Monoctenia, Gn.

Face with dense protuberant scales. Tongue developed. Antennæ in & unipectinated, towards apex simple. Palpi moderate, subascending, second joint clothed with dense projecting scales, terminal joints subovate. Thorax stout, densely hairy beneath. Anterior tibiæ in & with apical hook, all tarsi spinulose. Forewings with vein 10 connected with 9 by bar. Hindwings with veins 6 and 7 approximated at base.

The genus is at present confined to Australia. The species are very retired in habit in the imago state, and it is not unlikely

that their number may yet be considerably increased by rearing the larva, of which little is known. I have been able to obtain very few specimens for examination, and as they appear often to vary considerably in colour, the descriptions here given may prove incomplete.

	• •	
1.	Hindwings with hindmargin crenate, at	
	least in part	2.
	Hindwings with hindmargin crenate, at	
	most waved	3.
2.	Pale postmedian line dentate	77. smerintharia.
	Pale postmedian line not dentate	
3.	Hindwings with hindmargin almost straight	4.
	Hindwings with hindmargin rounded	5.
4.	Wings rosy, with a straight pale postmedian	
	line	74. vinaria.
	Wings ochreous-grey, without pale line	79. subustaria.
5.	Forewings with a large darker triangular	
	costal blotch	78. falernaria.
	Forewings without a large darker triangular	v
	costal blotch	6.
6	Forewings with three nearly straight reddish	
0.	lines	73. ochrinennata.
	Forewings without three nearly straight	, c. com spororowow
	reddish lines	76. obtusata.

73. Mon. ochripennata, Walk.

(Phallaria ochripennata, Walk. 284; Diamuna gastropacharia, ib. 289.)

 $\Im Q$. 55 mm. Head and thorax fuscous. Forewings formed nearly as in M. falernaria, but hindmargin entire; fuscous; a faint rosy straight line from $\frac{1}{3}$ of costa to $\frac{1}{3}$ of inner margin, and a similar slightly sinuate line from $\frac{5}{3}$ of costa to middle of inner margin; a fuscous-reddish nearly straight line, obscurely margined anteriorly with paler, posteriorly with darker, from

costa before apex to $\frac{3}{4}$ of inner margin: cilia fuscous-reddish. Hindwings with hindmargin rounded; dull purplish-rosy, becoming light fuscous towards anal angle; second and third lines as in forewings, but only visible on dorsal half; cilia rosy, becoming fuscous-red on lower half of hindmargin.

West Australia; two specimens in the British Museum collection, from which the above diagnosis is drawn.

74. Mon. vinaria, Gn.

(Oenochroma vinaria, Gn. IX. 185, pl. vii. 2; Balliace vetustaria, Walk. 290.)

3Q. 45-52 mm. Head pale brownish-ochreous, face suffused with purplish-rosy. Palpi, thorax, and abdomen light purplish-rosy. Antennæ rosy, towards apex more whitish, pectinations pale ochreous. Legs light purplish-rosy, apex of joints dark grey. Forewings elongate-triangular, apex acute, subfalcate, hindmargin suddenly sinuate beneath apex, thence bowed, oblique; pale ochreous, more or less wholly suffused with light purplish-rosy, posteriorly with a few faint cloudy grey strigulae; a nearly straight cloudy grey line from \(\frac{1}{3} \) of costa to before \frac{1}{3} of inner margin, preceded by an indistinct pale yellowish suffusion; a small cloudy roundish dark grey discal spot, containing a fine transverse linear transparent mark; a nearly straight cloudy pale yellowish line from costa before apex to 3 of inner margin, anteriorly partially margined with bright ferruginous preceded suffusedly by dark grey; a hindmarginal ferruginous-orange line, becoming blackish near apex: cilia deep ferruginous-brown. Hindwings with hindmargin almost straight, slightly waved; colour and cilia as in forewings; a straight dark purplish-fuscous transverse streak from middle of costa to middle of inner margin, becoming bifurcate towards costa, on lower 2 posteriorly ferruginous and followed by an ochreous-yellow suffusion. Forewings beneath with a large round cloudy deep purple-fuscous blotch near inner margin before anal angle.

Townsville, Queensland; Sydney, New South Wales; Mount Lofty, South Australia; four specimens. Bred by Mr. G. H.

Raynor from a larva feeding on *Hakea*: the larva is stated by Guénée, however, to feed on *Acacia* (perhaps in error), and is described as being 12-legged, with a horn on third segment and two tubercles on eleventh.

75. Mon. digglesaria, Gn.

(Monoctenia digglesaria, Gn., Ann. Soc. Fr. IV. [4 ser.], 15.)

55 mm. Wings crenulate; forewings acute, subfalcate, hind-margin strongly bowed; hindwings strongly bent in middle, forming a more prominent tooth, and another at anal angle; all wings rosy-grey; a common rosy-whitish line from apex of forewings to $\frac{2}{3}$ of inner margin of hindwings, followed by a darker shade, and preceded by small darker dots on veins; a series of darker dots representing first line; a darker median shade, hardly traceable on forewings, but straight and well-marked on hindwings. Forewings beneath with a large deep brown spot towards inner margin.

Locality given only as Australia. The above diagnosis is drawn from Guénée's description; I have seen no insect agreeing with it; it appears to indicate a good and distinct species.

76. Mon. obtusata, Walk.

(Monoctenia obtusata, Walk. 279; M. himeroides, ib. 279.)

Q. 54 mm. Head ochreous-whitish, face suffusedly mixed with dark fuscous-red. Palpi ochreous-whitish mixed with dark fuscous-red. Antennæ whitish. Thorax pale whitish-grey-ochreous. Abdomen fuscous-whitish sprinkled with blackish. Legs ochreous-whitish, irrorated and barred with deep fuscous-red. Forewings elongate-triangular, costa sinuate, apex produced, hindmargin rather deeply sinuate beneath apex, thence strongly bowed, very oblique; pale greyish-ochreous, sprinkled with dark fuscous; lines partially indicated by dark fuscous dots but hardly traceable except on costa, where they form slender short dark fuscous marks at $\frac{1}{3}$ and $\frac{3}{4}$, and a larger oblique cloudy fuscous mark in middle, containing a transverse-linear transparent mark in its apex, and indicating an angulated median shade: cilia fuscous-whitish, more

or less mixed and suffusedly dotted with dark fuscous, towards apex more or less wholly dark fuscous. Hindwings with hindmargin rounded, waved, slightly sinuate above anal angle; pale greyish-ochreous, sprinkled with dark fuscous, especially towards apex; a slightly curved cloudy fuscous median line, marked with a small darker spot above middle, containing a transverse linear transparent mark; cilia pale greyish-ochreous. Forewings beneath with a large round cloudy blackish-fuscous blotch towards hindmargin below middle.

Melbourne, Victoria; according to Walker also from Tasmania; one specimen.

77. Mon. smerintharia, Feld.

(Monoctenia smerintharia, Feld. pl. cxxiv. 18, 19.)

 \mathbb{Q} . 74 mm. Head and palpi deep ferruginous, crown paler. Thorax and abdomen grey irrorated with whitish. Wings formed as in M. falernaria, but hindmargin crenate; reddish-grey; a common obscurely pale dentate line running from apex of forewings to $\frac{2}{3}$ of inner margin of hindwings, anteriorly margined by a thick dark suffused shade, obsolete towards costa: cilia ferruginous, with darker spots on veins.

Locality uncertain; one specimen (Austr. Mus. Coll.).

78. Mon. falernaria, Gn.

(Monoctenia falernaria, Gn. IX. 184; M. fraternaria, ib. pl. vii. 3.)

3Q. 56-82 mm. Head pale whitish-fuscous, face dark fuscous-purplish, suffused with whitish-ochreous towards lower part. Palpi fuscous-purplish. Antennæ ochreous-whitish, pectinations ochreous. Thorax and abdomen pale flesh-colour. Legs fuscous, femora more purplish. Forewings elongate-triangular, hindmargin sinuate beneath apex, thence strongly bowed, oblique, waved on upper portion; rosy-purplish-ochreous, densely and suffusedly irrorated with pale greyish-ochreous, and strewn with blackish-grey scales; the absence of pale irroration forms an obscurely darker triangular

blotch extending on costa from before middle to \$\frac{1}{2}\$, its apex resting on vein 2 beneath middle of disc, its margins obscurely subdentate, sometimes suffusedly margined with dark fuscous and then with faint cloudy paler lines continued as one to inner margin; a small cloudy dark grey spot resting on inner margin beyond middle: cilia pale greyish-ochreous, base mixed with reddish, with small dark fuscous spots on veins. Hindwings with hindmargin rounded, slightly waved; colour and cilia as in forewings; the dark grey irroration forms a cloudy sinuate fascia before middle, followed by a light greyish-ochreous fascia without dark irroration; cilia of inner margin whitish.

Bathurst (2300 feet), New South Wales; also from Victoria and Tasmania; three specimens.

79. Mon. subustaria, Walk.

(Phallaria subustaria, Walk. 283; Hypographa privata, ib. 286; H. hypotaeniaria, Gn., Ann. Soc. Fr. IV. (4 ser.) 15.)

3. 40-42 mm. Head grey, slightly ochreous-tinged. Palpi whitish, with a few deep purple scales, towards apex grey. Antennæ grey-whitish, sometimes reddish-tinged, spotted with dark grey, pectinations ochreous. Thorax ochreous-grey, sometimes whitish posteriorly. Abdomen grey or whitish, with fine scattered purplish or black scales. Legs whitish, irrorated and ringed with blackish-crimson. Forewings elongate-triangular, apex acute, hindmargin sinuate beneath apex, thence bowed, oblique, waved; ochreous-grey, with some fine scattered black scales; costal edge sometimes white from near base to near apex; costa more or less marked with short blackish strigulæ; sometimes a small deep reddish cloudy spot on costa at 5, with faint traces of a curved reddish or fuscous transverse shade proceeding from it; a reddish-black discal dot; a curved line of reddish-black dots from 4 of costa to 3 of inner margin: cilia ochreous whitish, terminal half irregularly deep reddish or blackish. Hindwings with hindmargin nearly straight; colour and cilia as in forewings, but more whitish towards base of wing; a more or less distinct straight median fascia formed by reddish irroration, sometimes margined with blackish, narrowed towards inner margin, anterior edge sinuate, posterior dentate. Hindwings and sometimes also forewings beneath with a well-defined moderately broad median fascia formed by dark reddish-fuscous irroration, attenuated or becoming obsolete towards inner margin, posterior edge dentate, curved.

Sydney, New South Wales, in March; three specimens.

16. Hypographa, Gn.

Face with a broad rounded horny projection, more or less concealed in dense projecting scales. Tongue developed. Eyes fringed with long cilia above and beneath. Antennæ in 3 unipectinated, apex simple. Palpi moderate, subascending, second joint with long projecting hairs beneath, terminal joint moderate, somewhat swollen towards apex. Thorax stout, long-haired, beneath densely hairy. Tarsi spinulose. Forewings with vein 6 from point with or out of 9, 10 touching 9 at a point, 11 anastomosing with 12. Hindwings with veins 6 and 7 stalked or separate, 8 anastomosing with cell from near base to beyond middle.

This is a very singular genus. In the structure of vein 8 of the hindwings it departs from the family type, and assumes a character otherwise possessed only by the Larentiadæ; but it is absolutely certain from a consideration of the whole of the structural characters that its place is here, and that it is in fact nearly allied to Monoctenia. The unipectinated antennæ, very stout thorax, spinulose tarsi, and different neuration of forewings are conclusive against its reference to the Larentiadæ. The ciliated eyes and horny frontal projection are curious exceptional characters, probably indicating some ancestral reversion. In superficial appearance the species approach the Notodontidæ. I have no doubt that the genus may be regarded as developed collaterally with Monoctenia from a common ancestor, which was the direct progenitor of the whole of the thick-bodied group of this family. The anastomosis of vein 8 in the hindwings has arisen quite

independently of the similar structure in the *Larentiada*, and no affinity is implied by it, as the preponderance of other character shows; indeed, it might perhaps have been expected to arise independently more often, in which case the distinction of the families could not have been maintained.

80. Hyp. hiracopis, n.sp.

3. 38 mm. Head whitish, somewhat mixed with dark fuscous, face suffused with dark fuscous. Palpi whitish mixed with blackish. Antennæ whitish sprinkled with grey, pectinations ochreous. Thorax whitish mixed with fuscous hairs. Abdomen whitish irrorated with dark fuscous, two basal segments ochreous. Legs dark fuscous, partially irrorated with white. Forewings very elongate-triangular, costa subconcave, hindmargin rounded, strongly dentate; fuscous, densely and suffusedly strewn throughout with whitish; costa shortly strigulated with dark fuscous; veins marked with fine dark fuscous lines; a short oblique blackish mark from costa at 1, whence proceeds a very fine partially obsolete very deeply dentate dark fuscous line to inner margin before middle; an indistinct fuscous median shade from 3 of costa to 3 of inner margin, darker and more distinct in disc, strongly curved outwards on upper half; a very fine very deeply dentate dark fuscous line from $\frac{3}{4}$ of costa to $\frac{2}{3}$ of inner margin; a rather broad straight very ill-defined fuscous shade from apex to inner margin before anal angle; a fine dark fuscous hindmarginal line: cilia fuscous irrorated with whitish, tips whitish. Hindwings

with hindmargin rounded, dentate; 6 and 7 stalked; white, thinly scaled, posteriorly suffused with pale fuscous; veins on posterior half rather dark fuscous; a faint subdentate fine fuscous line at $\frac{3}{4}$; a fine dark fuscous hindmarginal line; cilia fuscous, suffusedly barred with whitish, tips whitish.

South Australia; one specimen. It is possible that this might be the other sex of the following species, but as Guénée's description, though incomplete, differs from it in very many details, I have not felt justified in uniting them.

81. Hyp. serpentaria, Gn.

(Hypographa serpentaria, Gn., Ann. Soc. Fr. IV. [4 ser.] 15.)

Q. Rather smaller than *H. phlegetonaria*, wings similarly formed, deeply dentate; forewings ashy-grey, wholly occupied by sinuous and contorted black lines, anteriorly margined with lighter grey; ordinary lines perceptible but entangled; an annular reniform discal spot; second line forming strong unequal teeth; an interrupted black hindmarginal line. Hindwings white from base to end of cell, thence dark grey crossed by three sinuate-dentate blackish lines, margined with white on inner margin, not reaching costa and anal angle, which are white. Underside of hindwings white with a dark fuscous central lunule and hindmarginal band.

Locality given as Australia only. The above description is modified from that of Guénée, who states his type to be in poor condition.

82. Hyp. phlegetonaria, Gn.

(Hypographa phlegetonaria, Gn. IX, 190, pl. xix. 2.)

30. 36 mm. Wings strongly dentate, blackish-grey, costa and base of cilia partly white; forewings with a blackish discal spot and four indistinct cloudy denticulate lines, most distinct on costa; first isolated, other three parallel and at equal distances; hindwings with three similar lines, first median, nearly straight, other two somewhat curved. Abdomen fuscous, ante-apical segment white at base, anal segment wholly whitish.

Tasmania. I have seen but unfortunately neglected to describe specimens of this species; the above diagnosis is taken from Guénée's description and figure, of which the former is very incomplete and partially unintelligible; I have endeavoured to interpret it by the aid of the figure, which is pretty good. It is an easily recognisable species.

83. Hyp. atmoscia, n.sp.

Q. 33 mm. Head, palpi, and thorax dark fuscous densely irrorated with whitish. Antennæ fuscous. Abdomen whitishfuscous sprinkled with dark fuscous. Legs dark fuscous. Forewings rather elongate-triangular, costa slightly sinuate, hindmargin rounded, crenate; fuscous, irrorated with whitish; a somewhat curved fine black line from beyond 1 of costa to before 1 of inner margin, indented above middle; a straight narrow dark fuscous fascia from ³/₅ of costa to ³/₅ of inner margin, anterior edge blackish, well-marked, posterior edge gradually suffused; a very fine subdentate blackish line from \$\frac{4}{5}\$ of costa to \$\frac{3}{4}\$ of inner margin, rather deeply sinuate inwards above middle and less deeply on lower half; some fine scattered blackish scales beyond this: cilia fuscous irrorated with whitish (imperfect). Hindwings with hindmargin slightly rounded, crenate; 6 and 7 separate; whitish-fuscous, with scattered dark fuscous scales; a straight cloudy fuscous central fascia, anterior edge tolerably distinct, posterior suffused; cilia fuscous mixed with whitish (imperfect).

Perth, West Australia; in November, one specimen.

APPENDIX.

The following species, referred by Guénée and Walker to the immediate neighbourhood of those included in this family are either wrongly so referred, or unidentifiable.

84. Panagra fictiliaria, Gn. X. 129. A clay-yellow species, described from Q only; I cannot identify it at all, but imagine it is probably wrongly placed here.

- 85. Panagra nullata, Gn. X. 130. A unicolorous yellowish-grey species, which appears unidentifiable, and is only conjecturally supposed to be Australian; it may be safely neglected.
- 86. Panagra sparsularia, Gn. X. 131, pl. XII. 4. Wrongly placed here; belongs to the Boarmiadae.
- 87. Panagra diffusaria, Gn. X. 132. An obscure unidentified species, perhaps referable to the Larentiadae.
- 88. Panagra subvelaria, Walk. 1000. No type seen; a Taxeotis, but unidentifiable.
- 89. Panagra aviata, Walk. 1001. Not fully identified, but appears to belong to Boarmiadae.
- 90. Panagra ferritinctaria, Walk. 1002. Belongs to Boarmiadae.
- 91. Panagra approximata, Walk. 1002; P. intercalata, ib. 1012. Belongs to Larentiadae.
 - 92. Panagra extentata, Walk. 1012. Belongs to Noctuina.
 - 93. Panagra inostentata, Walk. 1012. Belongs to Noctuina.

Index of Species of Monocteniadae.

ainaria, Gn	32.	bijugata, Walk	22.
anelictis, n.sp		buffalaria, Gn	
Angasi, Feld		capitata, Walk	14.
anthracopa, n.sp	6.	carbonata, Walk	54.
approximata, Walk	91.	chilonaria, HS	26.
areniferata, Walk	8.	chordota, n.sp	65.
aridaria, Walk	17.	compsotis, n.sp	37.
atmoscia, n.sp	83.	confluaria, Gn	61.
atrosignata, Walk	50.	consignata, Walk	59.
atyla, n.sp	20.	corrogata, Walk	21.
aurinaria, Gn	26.	costinotata, Walk	55.
aviata, Walk	89.	curtaria, Gn	21.

BY E. MEYRICK.

delogramma, n.sp	7.	ioneura, n.sp	47.
dentigeraria, Walk	36.	ischnota, n.sp	57.
devitata, Walk	40.	isomeris, n.sp	4.
diasemaria, Gn	33.	isophanes, n.sp	12.
diffusaria, Gn	87.	lasiocamparia, Gn	70.
digglesaria, Gn	75.	linda, Butl	50.
disputata, Walk	36.	liospoda, n.sp	42.
divergentaria, Gn	32.	lunaris, n.sp	64.
egenata, Walk	9.	lutosaria, Feld	69.
endela, n.sp	1.	metaxanthata, Walk	32.
epigypsa, n.sp	11.	molybdaria, Gn	54.
estigmaria, Walk	55.	molybdaria, Walk	58.
euscia, n.sp	51.	monoda, n.sp	67.
explanata, Walk	43.	mundiferaria, Walk	14.
explicataria, Walk	8.	nullata, Gn	85.
exsectaria, Walk	5.	obtusata, Walk 40,	76.
exsignata, Walk	41.	ochripennata, Walk	73.
extentata, Walk	92.	odontias, n.sp	35.
falernaria, Gn	78.	ophiucha, n.sp	52.
ferritinctaria, Walk	90.	ophiusaria, Gn	72.
fictiliaria, Gn	84.	oraula, n.sp	3.
flavicapitata, Gn	14.	orectis, n.sp	49.
fraternaria, Gn	78.	ornata, Walk	56.
gastropacharia, Walk	73.	orthotis, n.sp	45.
henricaria, Gn	71.	oxyderces, n.sp	30.
himeroides, Walk	76.	paraptila, n.sp	18.
hiracopis, n.sp	80.	paratacta, n.sp	39.
hypenaria, Gn	27.	partitaria, Walk	38.
hypotaeniaria, Gn	79.	perfabricata, Walk	29.
inconcisata, Walk	8.	perlinearia, Walk	8.
indicataria, Walk	53.	personalis, Feld	62.
inostentata, Walk	93.	petrilineata, Walk	59.
inspersa, Feld	27.	philodora, n.sp	13.
intercalata, Walk	91.	phlegetonaria, Gn	82.
intermixtaria, Walk	10.	plusiata, Walk	
intextata, Gn	8.	poecilotis, n.sp	

79.	stereospila, n.sp	2.
10.	steropias, n.sp	48
72.	stilbiata, Gn	60.
25.	subcelata, Walk	19.
16.	subpurpurea, Walk	70.
31.	subustaria, Walk	79.
16.	subvelaria, Walk	88.
	teliferata, Walk	22.
76.	transactaria, Walk	16.
55.	transcissata, Walk	24.
	traumataria, Gn	68.
	tricolor, Westw	23.
	triparata, Walk	58.
	tryxaria, Gn	
	ursaria, Gn	
	vetustaria Walk	74.
15.		
	10. 72. 25. 16. 31. 16. 70. 76. 55. 70. 81. 44. 77. 63. 86.	10. steropias, n.sp

REVISION OF THE GENUS HETERONYX, WITH DESCRIPTIONS OF NEW SPECIES.

BY THE REV. T. BLACKBURN, B.A., CORR. MEM. LINN. Soc. N.S.W.

PART V.

APPENDIX.

What I desire to supply in this Appendix is three-fold,—viz., notes on such previously described species of *Heteronyx* as I have failed to identify among the specimens to which I have had access,—amendments of ambiguities, &c., in the body of my work now completed,—and descriptions of species that have come into my hands subsequently to the publication of the parts of the "Revision" referring to the several "Sections" to which they belong.

As regards the previously described species there are a certain number that I have been compelled to disregard altogether,—viz., those in the published descriptions of which there is no account of the antennal structure, and of which at the same time I could not procure authentic types. To have applied the names of such species to any particular specimens could only have been guess work. They are the following:—infuscatus, Macl., pallidulus, Macl., parvulus, Macl., pubescens, Macl., ruficollis, Macl., subglaber, Macl., substriatus, Macl., subvittatus, Macl., transversicollis, Macl. One of these (pubescens) is a nom. præocc. The rest occur in localities distant from those in which any of my new species were taken, and (as most species of Heteronyx

seem to have a very limited area of distribution) this points to the probability of their all being distinct from any I have described.

After deducting the above 9 species as being (to me at least) incapable of identification, and allowing for several cases of synonymy, there remain 36 descriptions known to me as anterior to my work, all of which I believe to represent good species. Of these I have succeeded in identifying only 13 with insects before me, and these will be found referred to in their places in my work.

Of the remaining 23, 9 are from Tasmania and are very likely to be confined to that island (whence I have described only one new species) and 2 are from Raffles Bay, another isolated locality likely to produce species different from any I have seen. I have nothing before me agreeing satisfactorily with the description of any of them.

There then remain 12 species which (although I have been unable to identify them as represented among those before me) might appear likely on a priori grounds to be present there. Concerning 8 of these the descriptions supply sufficient information to enable me to feel fairly confident that I have not seen them; they are holomelænus, Blanch., laticeps, Burm., pellucidus, Burm., planatus, Burm., proximus, Burm., rubriceps, Blanch., rufomarginatus, Blanch., unguiculatus, Burm.

The remaining 4 (viz., laticollis, Blanch., nigritus, Blanch., pilosellus, Blanch., oblongus, Blanch.), are quite insufficiently described by their author, and it is possible that I have redescribed some of them.

The most convenient method, in adding a last word here and there to correct faults and furnish descriptions of species that have come into my hands subsequently to my having dealt with the aggregates to which they belong, will be to divide the species into groups (following the same classification as previously), and discuss those groups separately. I shall take them thus:—

- [Section I.]—Species with the labrum entirely and considerably below the plane of the clypeus, the clypeus itself being evenly reflexed all round its free margin, and at most feebly emarginate.
 - A. Antennæ 8-jointed...... Group I.
 - B. Antennæ 9-jointed..... Group II.
- [Section II.]—Species having the labrum much
 exposed to view from above
 (through profound emargination of the clypeus or other
 causes) but not rising above
 the level of the clypeus..... Group III.
- [Section III.]—Species having the clypeus more or less overtopped by the labrum.
 - A. Antennæ 8-jointed.
 - a. Claws bifid Group IV.
 - b. Claws appendiculate......, Group V.
 - B. Antennæ 9-jointed.
 - a. Claws bifid...... Group VI.
 - b. Claws appendiculate Group VII.

GROUP I.

Here I have to remark that in the "Revision" (Proc. L.S. N.S.W. 1888, pp. 1332-40) I omitted to state categorically that the anterior tibiæ of all the species (except *brevicollis*, Blackb., and *rufopiceus*, Macl.) known to me as belonging to this group have three well-defined teeth externally.

I have also to describe two new species recently received by me.

H. Bovilli, sp.nov.

Minus elongatus; postice sat dilatatus; ferrugineus; pilis brevibus adpressis sparsim vestitus; crasse fortiter sat sparsim (clypeo minus sparsim) punctulatus; labro clypeum haud superanti; antennis 8-articulatis; coxis posticis metasterno paullo brevioribus; unguiculis bifidis. [Long. 3-4, lat. 1\sum_5-2 lines.

The labrum is a little more prominent and upturned than in typical species of this section. The clypeus forms an almost perfectly even and continuous surface with the rest of the head, the clypeal suture being scarcely visible; its free margins are moderately reflexed and its front is feebly concave in the middle. The prothorax is about $\frac{3}{4}$ again as wide as long, its base being slightly more than \frac{1}{2} again as wide as its front, which is moderately concave with moderately prominent and sharp angles; the sides are feebly arched (almost parallel behind the middle), the hind angles well defined, the base is gently bisinuate and consequently but little lobed hindward in the middle. The elytra are scarcely wrinkled transversely, their lateral fringe being normal, their apical membrane very well-defined. The whole upper surface is strongly and coarsely, but not closely, punctured (the clypeus more closely, the pygidium more feebly, than the rest); the punctures so spaced that about 10 or 12 of average distance would occupy the middle line down the prothorax. The hind coxæ are a little shorter than the metasternum and decidedly longer than the 2nd ventral segment. The puncturation of the under surface is strong and somewhat even, but in all parts becoming less close towards the middle. The ventral series consist of fine hairs and are but little conspicuous. The lævigate antero-internal space on the hind coxe is but feebly defined. The hind femora are moderately wider than the intermediate, their inner apical angle strongly defined. The three external teeth of the front tibiæ are very strong and sharp, the uppermost being about half the size of the 2nd. The hind claws are minutely bifid, the produced piece of the basal portion being much thicker than, and about as long as, the apical piece.

In the tabulation of the 1st section of *Heteronyx* (Proc. L.S. N.S.W. 1888, pp. 1328, &c.) this species would fall under "C." (line 3, p. 1329), its companions under that letter being fulvohirtus and badius; the hind claws of the former of these are appendiculate (the produced apex of the basal piece being very much smaller than the apical piece), while the latter is an infinitely more closely punctulate insect than *H. Bovilli*.

N. Territory of S. Australia; taken by Dr. Bovill.

H. ADVENA, sp.nov.

Minus elongatus; postice vix dilatatus; ferrugineus, antennarum clava testacea; pilis minus brevibus adpressis minus sparsim vestitus; sat fortiter (postice gradatim minus fortiter) punctulatus; labro clypeum haud superanti; antennis 8-articulatis; coxis posticis metasterno vix brevioribus; unguiculis bifidis; segmentis ventralibus apicalibus vix perspicue punctulatis.

[Long. 3⁵₅, lat. 1⁴₅ lines.

The description of the head of H. Bovilli will apply to this species, subject to the remark that the clypeus is not at all emarginate in front. The description of the prothorax (disregarding puncturation) will apply moreover, except that in this species the sides are a little more arched and the hind angles are quite rounded off. The transverse wrinkling of the elytra is little noticeable, their lateral fringe normal, their apical membrane obscure. The puncturation of the head is coarse, strong, and rather close,—that of the prothorax and elytra successively feebler, that of the pygidium quite obsolete; the punctures on the prothorax are spaced so that about 14 or 15 of average distance apart would run in a line down the middle. There is some indication in this species of a sutural stria and the suture is slightly elevated, while in H. Bovilli the suture is non-striate and flat. The proportions of the various parts on the underside are almost as described above (vide H. Bovilli), but the hind coxæ are a little longer. The puncturation of the metasternum

and hind coxe is a little feebler than in *H. Bovilli*; the whole undersurface is minutely coriaceous and therefore less nitid, the ventral segments are almost without a trace of distinct puncturation, the ventral series are stout and conspicuous, the anterointernal tooth of the hind femora is very feeble, the uppermost tooth on the front tibiæ is much less than half the size of the 2nd, and the hind claws are bifid less minutely, the produced apex of the basal piece being distinctly smaller than the apical piece.

This species can be distinguished from all the others (having 8-jointed antennæ) of the 1st section by its impunctulate ventral segments. If its stout ventral series should place it in the group A (Proc. L.S.N.S.W. 1888, p. 1328) it would fall under FF (same page) with frontalis; among the species of BB (p. 1329) it would have to follow badius,—thus,

Locality uncertain; but I believe it to be Central Australia.

H. LILLIPUTANUS, sp.nov.

Minus elongatus; postice leviter dilatatus; rufo-piceus, antennis testaceis; pilis sat elongatis minus dense vestitus; crasse subrugulose punctulatus; labro clypeum haud superanti; antennis 8-articulatis; coxis posticis metasterno parum brevioribus; unguiculis appendiculatis.

[Long. 2 (vix), lat. 1 line.

The clypeus is evenly reflexed all round and its free outline forms a continuous even curve (the labrum being entirely below it); its plane is not evenly continuous with that of the rest of the head. The prothorax is half again as wide as long and its base (which is bisinuate and rather strongly lobed hindward in the middle) is more than half again as wide as the front which is moderately emarginate with moderately produced and sharp angles; the sides are rather strongly rounded, the hind angles quite

rounded off. The elytra are devoid of striation, their transverse wrinkling is very conspicuous, their lateral fringe normal, their apical membrane obsolete. The puncturation of the whole upper surface is coarse and rough. The puncturation of the undersurface is strong; on the metasternum it is moderately close but becomes less so hindward. The hind coxe are not much shorter than the metasternum and are very much longer than the 2nd ventral segment. The ventral series consist of long fine hairs and are moderately conspicuous. The hind femora are considerably wider than the intermediate with their inner apical angle very little developed. The hind claws are appendiculate, the basal piece about twice as large as the apical with its inner apex little produced. The front tibiæ are much compressed and dilated, with three large obtuse teeth on their external margin, of which the uppermost is about half as large as the 2nd.

This minute species seems to be allied to *H. hirtuosus*, Blackb., from which, however, it differs by many structural characters. In the tabulation it would stand side by side with *H. spretus*, Blackb., from which its small size will at once distinguish it.

A single example in my own collection; taken in the Adelaide district.

The following previously described species belonging (with more or less certainty) to this group (i.e., having the labrum entirely below the clypeus and 8-jointed antennæ) I have not been able to identify,—viz., rotundiceps, Blanch., spadiceus, Burm., and unguiculatus, Burm. Of these rotundiceps is said to be iridescent (differing thereby from all known to me in the group) and to occur in "Eastern New Holland;" its size is not specified. H. spadiceus is from Swan River (I have not seen any species of the group from Western Australia), its length is 4 lines, and it is described as entirely glabrous; the description of the relation of clypeus and labrum is vague,—the latter being merely said to "protrude in front of" the former,—but it would probably fall in this group; I do not think anything I have seen can be identical with it. H. unguiculatus is said to be from "New Holland,"

78

without more definite indication of locality; its labrum is said to rise to the level of the clypeus, but nevertheless the clypeus to be scarcely even sinuous in front; it appears to be a small species (long. 3-3½ lines), of a brownish-testaceous colour, with close fine puncturation, bidentate front tibiæ and strongly bifid claws.

GROUP II.

In the tabulation of the species (Proc. L.S.N.S.W. 1888, pp. 1329-31) I find a slight ambiguity of expression;—certain species being divided as having "E—the hind coxæ considerably (EE scarcely, if at all) shorter than the metasternum on the external margin." H. solidus (under the former initial) is separated from H. Beltanæ and satelles as having the hind coxæ "very little" shorter than the metasternum. The difference here indicated very satisfactorily separates the species, and the "very little" of solidus is quite distinct from the "scarcely, if at all" of æqualis and holosericeus,—but as it is undoubtedly obscurely worded in my tabulation I suggest the substitution (p. 1330, lines 26-30) of the following,—

- L. Hind angles of prothorax (viewed from above) appear well-defined [size more than 4 lines] solidus, Blackb.
- LL. Hind angles of prothorax (from all points of view) appear quite rounded off [size less than 4 lines].....

Neither am I quite satisfied with my treatment in this group of the claw structure which (since the issue of Part I. of the "Revision") I have found to be more useful for distinction of species than I at first thought. I think it well therefore now to supply the following more detailed and accurate information and to base it upon the *hind* claws. The claws more particularly referred to in the tabulation in Part I. were those of the *front* legs,—but as

these generally vary with the sex they furnish less reliable specific characters.

- A. Hind claws strongly "bifid,"—i.e., having the apex of the basal piece produced in a conspicuous process more than half as large as the whole of the apical piece—breviceps, rugosipennis, solidus, Beltanæ, corpulentus, holosericeus, piceoniger.
- B. Hind claws bifid (as above), but only minutely and at the apex —variegatus and Darlingensis.
- C. Hind claws "appendiculate,"—i.e., having at the inner apex of the basal piece a free projection less than half as large as the apical piece.
 - a. The appendiculation minute and close to the apex of the claw—aqualis, testaceus, satelles.
 - b. The apical piece fully as long as the basal piece—Froggatti.
 - c. The appendiculation normal—i.e., the basal piece a little longer than the apical and with its apical process more or less feeble—piceus, horridus, gracilipes, Victoris, occidentalis, pubescens, Randalli.

H. PICEONIGER, Macl.

Since the publication of Part I. of the "Revision" I have received from Dr. Bovill examples of a *Heteronyx* which agrees very well with the description of *H. piceoniger*, Macl. Mr. Froggatt of Sydney has done me the favour of comparing a specimen with the type and considers it the same species. In my tabulation (Proc. L.S.N.S.W. 1888, pp. 1328-31) it would fall side by side with *H. corpulentus*,* (HH. p. 1331) from which it may be at once distinguished by the exceptionally coarse and sparse puncturation of its head.

^{*} It should be noted however that the erect hairs on the elytra are scarcely to be called "long" (vide "GG." line 14, p. 1331) in H. piceoniger.

H. PUBESCENS, Er.

I have before me an example taken in Tasmania by Mr. T. G. Sloane, which I cannot doubt is this species, as it agrees perfectly with Erichson's description. M. Lacordaire (Gen. Col. III., p. 232, note) states that H. pubescens has simple claws, on the strength of which I expressed the opinion (Proc. L.S.N.S.W. 1888, p. 1328), that it could not be a true Heteronyx; but with the present specimen before me (which has distinctly appendiculate claws, the basal piece about twice as large as the apical), I am compelled to conclude that Lacordaire was mistaken. In Masters' Catalogue the species is assigned to Caulobius. In my tabulation H. pubescens would fall side by side with H. gracilipes, Blackb., from which it differs inter alia by the very much more obtuse teeth of its front tibiæ, the uppermost of them being subobsolete.

H. RANDALLI, sp.nov.

Minus elongatus; postice vix dilatatus; ferrugineus; pilis depressis minus dense vestitus; subtilius minus crebre (capite crasse rugulose) punctulatus; labro clypeum haud superanti; antennis 9-articulatis; coxis posticis metasterno sat brevioribus; unguiculis appendiculatis. [Long. $3\frac{2}{5}$ (vix), lat. $1\frac{2}{5}$ lines.

The clypeus is evenly reflexed all round and its free outline forms a continuous curve scarcely flattened or subsinuate in front (the labrum being entirely below); its plane and puncturation are almost perfectly continuous with the rest of the head, from which it is separated by a very obscure suture. The prothorax is about $\frac{3}{4}$ again as wide as long, its base (which is scarcely bisinuate but considerably lobed hindward all across) something less than $\frac{3}{4}$ again as wide as its front which is only moderately emarginate with angles not very sharp nor strongly produced; the sides are moderately rounded, and the hind angles are quite rounded off. The elytra have scarcely a trace of striation even along the suture, their transverse wrinkling is feeble, their lateral fringe is normal,

their apical membrane well defined. The puncturation (except on the head) is neither strong nor close, a little stronger and less close on the prothorax than on the elytra; on the prothorax the punctures are spaced so that about 17 of average distance apart would lie down the middle line. On the underside the hind coxe are much shorter than the metasternum but not very much longer than the 2nd ventral segment; the metasternum is rather finely and sparingly punctured, the hind coxe more coarsely, but with a well defined levigate antero-internal space. The ventral segments are rather coarsely punctured, the ventral series consisting of fine hairs and being inconspicuous. The hind femora are moderately wider than the intermediate, their inner apical angle feeble. The hind claws are appendiculate, the basal piece not much longer than the apical and having its inner apical angle fairly defined and sharp. The front tibiæ have three rather blunt external teeth, the uppermost being especially blunt and scarcely half as long as the 2nd.

In the tabulation (Proc. L.S. N.S.W. 1888) this species would fall under "D" (at bottom of p. 1329); from piceus and Froggatti it differs inter alia in the free outline of the clypeus not forming an even curve; from occidentalis in the same being feebly sinuate, not strongly emarginate.

Barrow's Creek, N. Terr.; taken by Mr. W. D. Randall.

H. DECEPTOR, sp.nov.

Minus elongatus; postice leviter dilatatus; minus nitidus; piceo-niger, antennis palpis tarsisque piceo-ferrugineis; pilis elon gatis suberectis confuse vestitus; crebre, sat rugulose, minus fortiter, punctulatus; labro clypeum haud superanti; antennis 9-articulatis; coxis posticis metasterno paullo brevioribus; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali vix longiori. [Long. $4\frac{3}{5}$, lat. $2\frac{2}{5}$ lines.

This species (apart from its shorter and wider form, the greater distinctness of the clypeal suture, the prothorax only about half

again as wide as long and with slightly more rounded sides, 9-jointed antennæ, the long scattered hairs rather thinly-increasingly so hindward-clothing its surface; the absence of a conspicuous red membranous border to the elytra, the much darker colour of the antennæ and palpi, the fine hairs on the legs and underside and which form the ventral series, and the shorter and more slender tarsi) scarcely differs from H. torvus, Blackb., the description of which (subject to the foregoing remarks) may be read as applying to it. In one example before me I find a faint indication of strize on the elytra, in the other none at all; H. torvus varies in this respect. It should be noted, however, that I have not seen a female example of this insect. In the tabulation (Proc. L.S. N.S.W. 1888, pp. 1328, &c.), this species would fall side by side with piceus, Blanch., from which inter alia the long hairs over its upper surface may be taken as a distinction.

Victoria; taken by Mr. T. G. Sloane in Gippsland.

H. PICEUS, Blanch.

I have received from Mr. T. G. Sloane a specimen of Heteronyx taken on the Blue Mountains which, with much doubt, I am inclined to regard as a very peculiar example of this insect. Its very diminutive size (long. $4\frac{2}{5}$ lines) is accompanied by a shortening of the hind coxæ, those organs being (not much, but certainly a little) smaller in proportion to the metasternum than in specimens of piccus from other localities. The appendiculation of the claws moreover seems to be a little nearer the apex in this example than in typical piccus. The resemblance to piccus however is too close to justify me in giving a new name on the inspection of a single example.

H. VIATOR, sp.nov.

Minus elongatus; postice leviter dilatatus; rufo-ferrugineus, antennis palpisque testaceis; pilis adpressis sat brevibus sat sparsim vestitus; sat fortiter minus crebre (capite crebre rugulose)

punctulatus; labro clypeum haud superanti; antennis 9-articulatis; coxis posticis metasterno sat brevioribus; unguiculis appendiculatis; unguiculorum posticorum parte basali apicali fere duplo longiori. [Long. $4\frac{2}{5}$, lat. $2\frac{1}{5}$ lines.

The clypeus is evenly reflexed all round, the curve of its free outline however being a good deal flattened or truncate in front (the labrum being entirely below it); its plane is moderately distinct from that of the rest of the head with a fairly marked arched suture. The whole head is coarsely and very closely (almost confluently) punctured and bears some longish erect hairs. The prothorax is slightly more than half again as wide as long, its base (which is bisinuate and moderately lobed in the middle) being about half again as wide as its front which is rather strongly concave, with sharp well-produced angles; the sides are moderately arched (at their greatest divergence a little behind the middle), and the hind angles are much rounded off,-scarcely defined from any point of view. The transverse wrinkling of the elytra is rather conspicuous, their lateral fringe is normal, their apical membrane obsolete. The hind coxe are considerably shorter than the metasternum but only moderately longer than the 2nd ventral segment. The whole undersurface is punctured very similarly to the elytra, the hind coxe however having a large levigate anterointernal space. The ventral series consist of fine hairs. The hind femora are moderately wider than the intermediate and have their inner apical angle but feebly defined. The hind claws are appendiculate, their basal piece being about twice as long as the apical. The three teeth on the front tibiæ are fairly strong and sharp, the uppermost being about half as large as the 2nd.

The elytra are punctured a little less closely, and more strongly, than those of *H. gracilipes*. The puncturation of the prothorax (being slightly stronger and sparser than of the elytra) all the more differs from that of *H. gracilipes*. In the tabulation (Proc. L.S.N.S.W. 1888, pp. 1328, &c.) this species would fall side by side with *H. Victoris* to which it is extremely close, but the differently shaped front of clypeus, prothorax more concave in

front and slightly more transverse, decidedly coarser puncturation of ventral segments, &c., together with totally different colour seem to point to specific distinctness. The punctures on the prothorax are spaced so that about 17 of average distance apart would range down the middle line.

Edithburgh; taken by Mr. McDougall.

The following species I have been unable to identify; some (and perhaps all) of them belong to this group.

H. laticeps, Burm. A large species (long. 6 lines) said to be of a chestnut colour and to have the apical membrane of its elytra very conspicuous. The description of its puncturation is very obscure, and there is no indication of locality beyond "Australia."

H. pilosellus, Blanch. The description of this species is identical with that of H. piceus in respect of all characters of any real value for identification. It is therefore quite likely that the species I have treated as H. piceus may be this. Both are said to occur in "Eastern New Holland."

H. planatus, Burm. Said to occur at Adelaide and to be remarkable for its depressed form (long. 4 lines). I know no species corresponding to this description.

H. precox, Er., H. tempestivus, Er. Both from Tasmania. According to Erichson both have 9-jointed antennæ, but Blanchard makes the former the type of a new genus with 8-jointed antennæ and peculiarly shaped labrum, while Lacordaire states that the latter has antennæ of only 8 joints. Under these circumstances it is evident that no species (at any rate unless taken in Tasmania) could be reasonably made to bear these names without having been compared with the original type.

GROUP III.

This group (identical with my Section II) consists of species that cannot rightly be placed in either of the other sections. The relation *inter se* of the labrum and clypeus is usually as follows:—

the labrum is turned upward as in Section III., but not so strongly that its summit surpasses the level of the clypeus; the clypeus is strongly emarginate in the middle (its reflexed margin being carried evenly all round the edge of the emargination) and this emargination opens a gap through which the labrum is very conspicuously discernible; or the clypeus is more nearly truncate in front, the species having it so being distinguishable from nearly all of Section III. by their clypeal outline not having from any point of view a "trilobed" appearance.

As the number of species belonging to this group described in my former paper was small, and I have a good many to add now, I think it will be convenient to give a new tabulation, as follows:—

A. Antennæ 8-jointed rubescens, Blanch.	
AA. Antennæ 9-jointed	
*B. Front of clypeus more or less truncate or lightly concave	
C. Surface of the elytra normally pubescent	
D. Hind coxæ very much shorter than metasternum, — their external hind angles quite rounded off	
E. Clypeus punctured very much more closely than the hind part of the head	
F. Prothorax considerably wider at base than in front granum, Burm.	

^{*} H, granum, Burm., verges towards "BB" in the form of its clypeus, and H. obesus verges towards "B," the clypeus of the latter being scarcely very much more deeply excised in the middle than that of H. granum. There can be no mistake as to which of these groups any of the other 9 species fall into.

FF. Prothorax scarcely wider
at base than in front diversiceps, Blackb.
EE. Head punctured uniformly or nearly so æqualiceps, Blackb.
DD. Hind coxe not much shorter than metasternum,—their external hind angles sharply defined quadraticollis, Blackb.
CC. Surface of elytra sparsely set with very long erect hairs rising from shining granules setifer, Blackb.
BB. Middle of free clypeal outline deeply, and more or less narrowly, excised
C. Head punctured
D. Surface of elytra not set with erect setæ
E Summit of labrum consider- ably below level of clypeus
F. Prothorax not much more than half again as wide as long simulator, Blackb.
FF. Prothorax about $\frac{3}{4}$ again as wide as long fissiceps, Blackb.
EE. Summit of labrum scarcely below level of clypeus
F. Puncturation of upper surface fine and very close excisus, Blackb.
FF. Puncturation of upper surface coarse and sparse obesus, Burm.

H. SETIFER, sp.nov.

Sat elongatus; minus convexus; postice vix dilatatus; sat nitidus; ferrugineus, antennis, palpisque testaceis; elytris setis longis fulvis erectis (haud pilis brevibus adpressis intermixtis) sparsim vestitus; capite (clypeo crebre rugulose excepto) subtiliter leviter minus crebre, prothorace dupliciter (subtiliter et vix subtiliter) leviter sat sparsim, elytris squamose vix crebre sat crasse nec fortiter, pygidio leviter sat sparsim, punctulatis; labro clypeum haud superanti (hoc antice concavo); antennis 9-articulatis; unguiculis appendiculatis, unguiculorum posticorum parte basali apicali vix longiori; coxis posticis metasterno haud brevioribus.

[Long. $5\frac{2}{5}$, lat. $2\frac{4}{5}$ lines.

The relation of labrum and clypeus inter se is such in this species as to render its position in my arrangement very doubtful; the summit of the labrum is scarcely below the level of the clypeus and this latter (though arcuately emarginate in front and with a continuous reflexed margin) has not the deep more or less triangular excision in the middle that is usual in the species of Section II. It is distinguished, however, from nearly all the species of Section III., by the relation of labrum and clypeus being such that from no point of view has the free outline of the head the very slightest "trilobed" appearance,—the middle lobe (i.e., the labrum) from the most favourable point of view appearing to have a concave outline. The clypeus is closely and finely rugulose in strong contrast to the rest of the head and the prothorax, which are finely, smoothly, faintly and not closely punctulate. The prothorax is a little more than half again as wide as long, the base (which is bisinuate and moderately lobed hindward in the middle) not quite half again as wide as the front which is rather strongly concave with sharp fairly well-produced angles; the sides are very little arched, the hind angles much rounded off.

The elytra are punctured considerably more strongly than the prothorax; their transverse wrinkling is fairly defined, their apical membrane obsolete; the setæ are placed more or less in rows on their surface and spring from minute pustules. The hind coxæ are very fully as long as the metasternum. On the undersurface the metasternum is punctured fairly strongly and not very closely, the hind coxæ more feebly and more closely (with a distinct lævigate antero-internal space) the hind body very finely. The ventral series spring from conspicuous pustules and consist of stoutish hairs. The hind femora are much wider than the intermediate and have their inner apical angle scarcely defined. The basal joint of the hind tarsi is much longer than the 2nd joint (a very unusual character). The 3 external teeth of the front tibiæ are moderately strong but not very sharp.

Extremely like *H. granulifer*, Blackb., but differing from it widely in respect of structural characters.

Adelaide district.

H. DIVERSICEPS, sp.nov.

Sat elongatus; postice minus dilatatus; sat nitidus; ferrugineus, pilis sat longis suberectis crebrius vestitus; clypeo crebre fortiter rugulose, capite postice sparsius minus rugulose, prothorace subfortiter sat crebre, elytris crebrius minus fortiter squamose, pygidio ut prothorax, punctulatis; labro clypei superficiem haud admodum attingenti, nihilo minus superne conspicuo; antennis 9-articulatis; unguiculis bifidis. [Long. 3, lat. 1²/₅ lines.

This is another species that seems a little to hover been Sections II. and III., the labrum and clypeus being very similar to those of *H. setifer* except that the latter is scarcely at all emarginate in front. Like *H. setifer* it shows no indication (from any point of view) of the outline of the head being trilobed. The clypeus is very distinct from the rest of the head, from which it is separated by an almost straight suture, its front being distinctly reflexed and scarcely emarginate, the labrum projecting forward considerable in front of it, but not quite rising to its level. The

prothorax is rather more than half again as wide as long, its base not much wider than its front, which is moderately concave (slightly bisinuate), with but little produced and not very sharp angles; the sides are gently arched, the hind angles much rounded off, the base being gently convex all across. The elytra are punctured more closely than, but about as strongly as, the prothorax; their lateral fringe is normal, their apical membrane scarcely defined. The hind coxe do not exceed the 2nd ventral segment in length. The puncturation of the metasternum and hind coxe is strong and fairly close on the sides, becoming more sparse towards the middle, the latter having an elongate lavigate antero-internal space. The ventral segments are punctured rather strongly and by no means closely all across; the ventral series are moderately conspicuous and consist of long fine hairs. The hind femora are very little wider than the intermediate, their inner apical angle but little marked. The three external teeth of the front tibiæ are stout and blunt, the uppermost very much less than half the size of the middle one. The apical piece of the hind claws is less than \frac{1}{3} the size of the basal piece, and about twice as large as the produced apex of the latter.

Perhaps near *H. tempestivus*, Er., or *præcox*, Er., but (apart from the difficulty of the antennæ of those species having been subsequently said to be only 8-jointed) Erichson says that the puncturation of the underside is more or less obsolete, whereas in this insect it is particularly strong and well-defined.

South Tasmania; taken by Mr. T. G. Sloane.

H. GRANUM, Burm.

Sir William Macleay has sent me under this name a S. Australian specimen of an insect that I have several times met with in the Adelaide district. The examples I have seen vary in size (long. 2-3 lines). I think it not unlikely to be correctly named, although Burmeister's description is not minute enough to allow of any certainty. The objection to the identification is principally that Burmeister says "labro altissimo," from which it

might be inferred that the labrum strongly overtops the clypeus, whereas in this species it scarcely reaches the level of the upper surface of the same. As, however, the labrum stands out strongly in a forward direction, and its upward directed part is very perpendicular, it has the appearance on a casual glance of being very high.

This insect is so extremely like the preceding (*H. diversiceps*) that the description of that species may be taken to apply to it, with the following modifications:—the clypeus, instead of being evenly truncate in front with a well-defined continuous reflexed margin, has the front edge turned up perpendicularly,—so that if the erect face of the labrum be looked at from in front, the front of the clypeus seems to stand up behind it as another similar erect surface; the prothorax is considerably narrowed forward and is much more strongly lobed hindward in the middle, its puncturation being scarcely different from that of the elytra; the three external teeth of the front tibiæ are stronger and sharper.

H. ÆQUALICEPS, sp.nov.

Parum elongatus; postice minus dilatatus; sat nitidus; ferrugineus, pilis sat brevibus adpressis vestitus; capite toto sat æqualiter sat fortiter sat crebre, prothorace elytrisque minus fortiter, punctulatis; labro sat fortiter porrecto clypei superficiem haud attingenti; antennis 9-articulatis; unguiculis bifidis.

[Long.
$$2\frac{3}{5}$$
-3, lat. $1\frac{2}{5}$ - (vix) $1\frac{1}{2}$ lines.

This species is so evidently a close ally of the preceding two that it would seem hardly possible to place it in another section, but it is undeniable that the labrum is not very much more prominent than in some species of Section I. (e.g., Bovilli). It (i.e., the labrum) is not protruded forward so much as in the preceding two species, neither does it rise so nearly to the level of the clypeus,—nevertheless it is certainly more prominent and more turned up than in the species that I have placed in Section I. The clypeus is gently but very distinctly emarginate in front, the sides of the

emargination forming a very obtuse angle with each other. The entire head (including the clypeus) is very evenly punctulate. Subject to the above remarks the description of *H. diversiceps* may be read as applying to this species. It must be noted, however, that the clypeal suture is less straight being somewhat conspicuously angulated in the middle, that the prothorax is slightly less transverse and more narrowed anteriorly with the base a little more (and the front a little less) bisinuate, that the hind coxæ are scarcely so short, that the ventral segments are much more finely punctured, that the teeth on the front tibiæ are sharper, and that in the hind claws the produced apex of the basal piece seems a trifle larger.

Mulwala, N.S.W.; taken by Mr. T. G. Sloane.

H. QUADRATICOLLIS, sp.nov.

Minus elongatus; postice leviter dilatatus; sat nitidus; ferrugineus; pilis adpressis minus brevibus minus sparsim vestitus; sat crasse minus profunde minus crebre (clypeo sat crebre excepto) punctulatis; labro sat fortiter porrecto clypei superficiem haud attingenti; antennis 9-articulatis; unguiculis posticis appendiculatis, elongatis, gracilibus. [Long. 32, lat. 14 lines.

This species seems to be a close ally of the preceding three species although considerably larger than any of them. The head scarcely differs from that of *H. diversiceps* except in being a little wider, with the clypeus slightly more emarginate in front. The description of *H. diversiceps* may be read as applying to this insect with the following additional modifications:—the anterior angles of the prothorax, though scarcely so sharp, are much more prominent, the hind angles of the same are fairly defined, the base is evidently bisinuate and the puncturation is stronger and closer, being almost uniform with that of the elytra; the hind coxe are much longer, being considerably longer than the second ventral segment, and (although decidedly yet) not very much shorter than the metasternum; the three external teeth of the front tibic are

quite sharp; the claws are decidedly longer, those of the hind legs being very slender with the basal piece scarcely twice (and its inner apical projection less than half) as large as the apical piece. In my unique example (a male) the front claws are bifid.

Port Lincoln, S. Australia.

H. FISSICEPS, sp nov.

Sat elongatus; postice minus dilatatus; sat nitidus; ferrugineus, pilis sat brevibus adpressis sparsim vestitus; capite toto crebre rugulose sat æqualiter, prothorace pygidioque leviter subtiliter minus crebre, elytris subtiliter sat crebre, punctulatis; clypeo antice profunde triangulariter exciso, labro clypei superficiem haud attingenti; antennis 9-articulatis; unguiculis bifidis.

[Long. 3, lat. $1\frac{2}{5}$ lines.

The anterior emargination of the clypeus (the reflexed border of which is strong and continuous) is so deep as to indent it not much less than half-way to the clypeal suture which is carinated and very conspicuous; the labrum is scarcely protruded forward and does not rise very near the level of the clypeus, but the deep excision of the latter renders it visible from above. The prothorax is a little more than \(\frac{2}{3} \) again as wide as long, the base (which is moderately convex hindward all across) being about half again as wide as the front, which is moderately concave with fairly wellproduced sharp angles; the sides are somewhat feebly arched and the hind angles are much rounded off; the puncturation is fine and lightly impressed, and spaced so that about 18 or 19 punctures of average distance apart would range down the middle line. The puncturation of the elytra is a little closer and a trifle stronger, their transverse wrinkling is little noticeable, their lateral fringe normal, their apical membrane scarcely developed. On the underside the hind coxe are a good deal shorter than the metasternum; they and it are lightly and somewhat closely, but not finely, punctured. The puncturation of the ventral segments is sparse and so feeble as to be almost obsolete; the ventral series consist of fine hairs and are conspicuous. The hind femora are not

much wider than the intermediate, their inner apical angle being fairly defined. The three external teeth of the front tibiæ are strongly developed, but are not very sharp. The hind claws have a decidedly bifid appearance owing to the apical projection of the basal piece (the basal piece itself being fully twice as large as the apical) standing out very conspicuously, but when examined it is seen to be less than half as large as the apical piece.

Mulwala, N.S.W.; taken by Mr. T. G. Sloane.

H. excisus, sp.nov.

Sat elongatus; postice vix dilatatus; minus nitidus; ferrugineopiceus, pilis sat brevibus adpressis minus crebre vestitus; crebre subtiliter (capite crassius excepto) punctulatus; clypeo medio fortiter arcuatim exciso, labro clypei superficiem haud attingenti; antennis 9-articulatis; unguiculis appendiculatis.

[Long. 5, lat. 2^2_5 lines.

The clypeus is very peculiar in shape, appearing to have had a small (semicircular) piece cut out of the middle of its front, the cavity thus formed (reaching back about a third of the distance from the front margin to the clypeal suture) having a continuous reflexed margin, and leaving the labrum distinctly visible from above, although the latter does not rise to the level of the clypeus; the clypeus does not quite form a continuous plane with the rest of the head; the clypeal suture is well marked and feebly arched. The prothorax is $\frac{2}{3}$ again as wide as long, the base (which is scarcely bilobed and only feebly convex hindward) being not quite half again as wide as the front which is deeply concave with sharp strongly produced angles; the sides are gently arched in front and almost parallel behind, the hind angles (viewed from above) sharply rectangular; the puncturation is a little asperate and quite close, so that about 30 punctures or more of average distance apart would range down the middle line. The elytra are punctured smoothly and a little more finely and sparsely than the prothorax; their transverse wrinkling is fine and not very noticeable, their lateral fringe normal, their apical membrane obsolete. The under-

79

side is punctured about as closely as the elytra, the punctures on the metathorax being a little stronger than those of the elytra, and on the ventral segments scarcely so strong; the puncturation of the metathorax and hind coxæ becomes sparser towards the middle line (the latter having a well defined lævigate antero-internal space), that of the ventral segments scarcely sparser but evidently finer. The hind coxæ are about intermediate in length between the metathorax and 2nd ventral segment. The hind femora are a good deal wider than the intermediate and have their inner apical angles blunt but fairly defined. The ventral series consist of hairs and are not particularly conspicuous. The three external teeth of the front tibiæ are strong and sharp, the uppermost less than half as large as the 2nd. In the hind claws the basal piece is quite twice as large as the apical, its inner apical projection being small.

The puncturation of this species is extremely similar to that of *H. torvus*, Blackb.; compared with that of *H. piceus*, Blanch., it it is slightly finer and closer on the elytra, and much closer and more asperate on the prothorax.

Mulwala, N.S.W.; taken by Mr. T. G. Sloane.

H. obesus, Burm.

I feel little or no doubt of the correctness of my identification of this species, in which I am confirmed by Sir William Macleay. It appears to occur over an exceptionally extended area; I have seen examples from Woodville, Kangaroo Island, Victor Harbour, Port Lincoln (all in S. Australia), and King George's Sound. Structurally it is very close to *H. excisus*, Blackb., but differs very widely in superficial characters, the upper surface being almost glabrous, the puncturation infinitely less close (that of the hinder part of the head and of the prothorax feeble and sparse,—spaced so that about 12 or 13 punctures of average distance apart would range down the middle line of the prothorax,—that of the elytra almost as sparse but much stronger), the uppermost tooth of the front tibiæ smaller and the lower two teeth longer and sharper.

SECTION III. (GROUPS IV.-VII.).

The limits between this section and the preceding one are not as clearly defined as I could wish, as there are a few species in each section which I have placed there with more or less doubt. However, since all the species whose head presents the appearance of a "trilobed outline" belong to this section with the addition of very few others,—it will be only in respect of a very small number that doubt can arise;—especially as in most or all of those placed in this section and yet not showing indications of a "trilobed outline" of the head,—the labrum rises very markedly above the clypeus.

GROUP IV.

Mr. T. G. Sloane has lately sent me two examples taken at Mulwala, N.S.W., that appear to be identical with my *H. sub-metallicus* from Port Lincoln.

GROUP V.

H. DUBIUS, Blackb.

I have recently received from Mr. McDougall (of Moonta) an example which perhaps belongs to this species, though it is smaller than the type (long. 4 lines) and of a much darker colour,—except the antennæ which are testaceous; it differs from the type also in being much more pubescent (the type is an old and probably abraded specimen) with the hind angles of the prothorax appearing slightly more defined, the apical membrane of the elytra a little more apparent and the external teeth of the front tibiæ a little sharper. It was taken near Adelaide.

H. NASUTUS, Blackb.

In the original description of this species the hind claws were called "appendiculate" without further remark,—but it would be well to note that the claws have very much the appearance of those which I have called "bifid," the inner apex of the basal

piece being very conspicuously produced; this produced apex however is very slender, and not quite half as large as the apical piece,—but I am not sure the insect would not be more at home among those with bifid claws.

H. PINGUIS, sp.nov.

Minus elongatus; postice dilatatus; sat nitidus; niger, elytris piceis, antennis, palpis, pedibusque obscure rufo-piceis; pilis brevibus adpressis griseis sat sparsim vestitus; capite crebre, prothorace et elytris minus crebre, sat crasse punctulatis; pygidio opaco subtiliter subcrebre punctulato; labro clypeum sat fortiter sat anguste superanti; antennis 8-articulatis; unguiculis posticis appendiculatis; coxis posticis metasterno sat brevioribus.

[Long. 5 (vix), lat. $2\frac{1}{2}$ lines.

The head is unusually narrow; its "trilobed" appearance is very well defined, the middle lobe appearing scarcely so long, and about half as wide, as the lateral lobes. The margin of the clypeus is strongly reflexed except in the middle where it is quite obsolete; the clypeus does not form a continuous surface with the rest of the head from which it is separated by a feebly angular suture. The prothorax is about \(\frac{2}{3} \) again as wide as long, its base (which is feebly bisinuate and moderately lobed hindward in the middle) being about $\frac{2}{3}$ again as wide as the front, which is rather strongly concave with fairly produced sharp angles; it is widest near the base; its sides are gently rounded; the hind angles appear fairly defined from the most favourable point of view, the puncturation is spaced so that about 15 or 16 punctures of average distance apart would range down the middle line. The transverse wrinkling of the elytra is moderately defined, their lateral fringe normal, their apical membrane very distinct. The hind coxe are considerably shorter than the metasternum, and considerably longer than the 2nd ventral segment; they and the metasternum are punctured rather strongly,—somewhat closely at the sides, less so towards the middle,—the lævigate antero-internal space being scarcely defined. The ventral segments are punctured more finely,

—but somewhat evenly all across. The ventral series consist of stout testaceous hairs and are conspicuous. The hind femora are much wider than the intermediate and have their inner apical angle well defined. The external teeth of the anterior tibiæ are strong and blunt, the uppermost very close to and about half as large as the second. In the tabulation (P.L.S.N.S.W. 1889, p. 144) this species would fall under "GG," though the puncturation of the ventral segments is a little stronger than in H. crassus, Augusta, and Sloanei; the hind angles of the prothorax are as in H. Sloanei, from which the present species differs inter alia by its much smaller head.

Sent to me by Sir William Macleay as *H. holomelænus*, Blanch., but that species is especially stated to have 9-jointed antennæ.

N. S. Wales.

GROUP VI.

H. POTENS, Blackb.

Among a miscellaneous batch of specimens sent to me some time ago by Mr. Sloane,—taken by him from flood refuse on the banks of the Murray,—I find a specimen which I cannot separate from *H. potens*; it differs, however, from all the numerous other examples I have seen in having the hairs on its upper surface all erect instead of recumbent. Whether the horrors of its situation when it fell into Mr. Sloane's hands made its hair thus stand on end I cannot say, but certainly it seems to possess no structural character suggestive of its being a distinct species.

The following species,—appertaining probably to my Section III. of *Heteronyx*,—I have been unable to identify. All of them except *H. unicolor*, Blanch., appear to have 9-jointed antennæ. The first 7 are from Tasmania, and very probable may be confined to that island.

H. Australis, Guér. Long. 5 lines. Not among the few Tasmanian Heteronyces I have seen. It would not be safe to apply

the name to any species from another locality without seeing the type.

H. hepaticus, Er. (stated by M. Blanchard to be identical with H. Australis).

H. fumatus, Er., H. glabratus, Er., H. unicolor, Blanch. Long. $4\frac{1}{2}$ lines. The descriptions are too vague to be identified safely with any specimen not from Tasmania; none of the Tasmanians I have seen agree with them.

H. striatipennis, Blanch. (already referred to,—vide p. 671).

H. dimidiatus, Er. (already referred to,—vide p. 668).

H. obscurus, Blanch. From Raffles Bay, N. Australia. Long. $4\frac{1}{2}$ lines. A black species, with the club of the antennæ black; I feel sure I have not seen it.

 $H.\ pilosus$, Blanch. From Raffles Bay. Long. $3-3\frac{1}{2}$ lines. A pale-coloured, very pilose species; the prothorax very finely, the elytra very deeply punctulate. I feel sure I have not seen it.

H. pellucidus, Burm. Long. 3 lines. From S. Australia. I cannot identify this description with any of the numerous S. Australian Heteronyces before me. The species seems to be a very distinct one,—of testaceous colour, with the prothorax almost lævigate, elytra fairly strongly punctulate, front tibiæ with 2 well-defined teeth and also a minute notch close to the knee, front claws of 3 unequal inter se.

H. proximus, Burm. Long. 5 lines. From W. Australia. Said to be very like H. agrestis but even more finely punctured. I have seen nothing from W. Australia agreeing with these characters; the description is not detailed enough to justify its identification with species from other parts of the continent, especially since the presumption is strongly against a W. Australian species of Heteronyx occurring elsewhere. H. obesus is the solitary instance known to me of such a distribution,—unless the tropical examples of H. agrestis (?) referred to on page 688 be

an example in point,—but I am convinced they will prove to represent a distinct species when more material can be examined.

H. holomelænus, Blanch. Long. 5 lines. From Eastern Australia (already referred to,—vide pp. 1218, 1243). An entirely black insect with the club of the antennæ pitchy-red,—closely punctulate. Perhaps near H. rhinastus, Blackb., which however has testaceous antennæ. The note as to the unusual colour of the antennæ is the only mention of a really marked character in Blanchard's description.

 $H.\ laticollis,$ Blanch. Long. $5\frac{1}{2}$ lines. From Eastern Australia. The head and prothorax appear to be much wider than in any species known to me and in other respects likely to be identical. The other characters mentioned in the description are all vague.

 $H.\ nigritus$, Blanch. Long. $3\frac{1}{2}$ lines. From Eastern Australia. A black species with testaceous antennæ and palpi, and pitchy or reddish legs; so far suggestive of nigrinus, Blackb.,—but the species as compared with the preceding is said to be "planior" and the elytra are called "fere planis" which seems to remove it far from my nigrinus.

 $H.\ oblongus$, Blanch. Long. $4\frac{1}{2}$ lines. From Eastern Australia. There is no salient character mentioned in the description of this insect which would apply to not a few of the examples before me; I cannot identify it with any one in particular. The species appears to be of a brownish-red colour, to have some ashy pubescence,—the prothorax to be very slightly wider than the elytra (if this is strictly correct I am convinced that I have not seen the species) and finely punctulate,—the elytra to be finely punctulate-rugulose, and the pygidium closely punctulate. This is all the information contained in the description.

H. ovatus, Blanch. Long. 3-4 lines. From Eastern Australia and Tasmania. Notwithstanding its name the form of this species is said to be "oblongus." The description is almost in the same words as that of H. oblongus,—from which it appears to differ by being slightly smaller, with less silky pubescence and the prothorax

scarcely so wide as the elytra. Such statements as the last of these are quite useless unless they be founded on exact measurements. I know no particular species that agrees with this description though it would come near fitting a good many.

H. rubriceps, Blanch. Long. 6 lines. From Eastern Australia. Prothorax said to be wider than elytra, and elytra almost flat,—head appears to be conspicuously reddish. I have seen no large species presenting these characters.

 $H.\ rufo-marginatus$, Blanch. Long. $4\frac{1}{2}$ -5 lines. From Eastern Australia. The conspicuously red margin of the elytra and prothorax would seem to distinguish this species strongly from all known to me. It is perhaps not unlike $H.\ marginatus$, Blackb., following the description of which some remarks on it will be found.

NOTES ON AUSTRALIAN COLEOPTERA, WITH DESCRIPTIONS OF NEW SPECIES.

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PART V.

CARABIDÆ.

SILPHOMORPHA AMABILIS, Cast.

Among the insects taken by Dr. Bovill in the N. Territory of S. Australia is a specimen that seems to appertain to this species, though it is difficult to be quite sure as Count Castelnau's description deals only with colour and markings. In respect of these the example before me shows the following discrepancies,—the prothorax instead of being "yellow with a large black spot occupying its centre" is black with the lateral margins broadly yellow and the front and hindmargins narrowly pitchy-red; the base of the elytra instead of having "a black spot near the centre" is narrowly black on its inner half, with the black colour a little dilated at its outer extremity. The elytra are widely and feebly (but quite regularly and distinctly) costate, a wavy and very fine scratch-like stria running between each two costæ. The species may be readily recognized by the remarkable resemblance of the black markings (excluding the narrow black edging of the apex), when viewed with the head towards the observer, to the figure of a tree,—the black front portion of the suture representing the trunk, and the mark that Castelnau calls a "black fascia" representing the branches and foliage.

SCOLYPTUS OBSCURIPES, sp.nov.

Minus elongatus; minus nitidus; niger, antennis palpisque rufescentibus, tarsis rufo-piceis; menti dente lato triangulari lobis lateralibus multo breviori, his coriaceis longitudinaliter leviter striatis; antennis brevibus, apicem versus articulis (ultimo excepto) subquadratis; clypeo antice convexo sat fortiter reflexo; vertice convexo lævi; prothoracis longitudine latitudini æquali antice sat angustato, basi utrinque fovea (vix antice lineatim producta) leviter impresso; elytris sat fortiter convexis, striatis; striis internis antice sat fortiter impressis et distincte punctulatis, lateralibus totis (omnibus postice) leviter impressis et vix punctulatis; interstitio 3° 4-punctulato; epistomatis alis antice haud lateraliter dilatatis; tibiis anticis extus tridentatis, dentibus acutis sat elongatis.

[Long. 6½, lat. 1⁴ lines.

A much less elongate and less parallel species than S. procerus, Putz., remarkable by the structure of the front of its clypeus, the reflexed margin of the lateral wings being continued evenly all across in a gentle arch as the front margin of the clypeus. The lateral wings of the clypeus resemble those of S. procerus, not being prominent laterally at their apex (as they are in S. rugiceps, Macl., which M. Putzevs affirms to be his S. planiceps); the antennæ however are considerably shorter than in that species, joints 8-10 being little or not longer than wide; while the prothorax scarcely differs, being nevertheless a trifle less narrowed in front and having the impression on either side near the base more like an oblong feeble fovea and scarcely produced forward as an impressed line. The sculpture of the elytra closely resembles that of S. procerus, though the strice are somewhat stronger and the interstices a little more inclined to convexity, especially in The anterior tibiæ resemble those of S. procerus, but the external teeth are distinctly longer (resembling the lower three in S. rugiceps, Macl.), and the inner apical spine is slightly shorter than in the female of that species; the median tooth of the mentum is evidently more pointed in front.

The example before me appears to be a female; it is likely that in the male the inner apical spine of the anterior tibiæ is differently formed, and the tibia itself narrower and less strongly dentate externally.

Of the previously named species of this genus, abbreviatus, Putz., crassicollis, Putz., and prominens, Putz., are not described, their author having merely, in notes consisting of three or four lines, mentioned three or four points of difference between them and S. oblongus, planiceps, and procesus respectively; they appear to be so extremely close to those species as almost certainly to differ similarly from the present one in most respects. From planiceps and processes, as well as marginatus, Putz., its stout short antennæ,-with subapical joints almost transverse, sufficiently distinguish S. obscuripes. S. oblongus and its satellite (abbreviatus) appear to have antennæ more or less resembling those of the present species,—but in oblongus the elytra are said to be "simply striated," and abbreviatus is differentiated from oblongus by there being "traces of puncturation towards the base of the internal striæ,"-whereas in S. obscuripes the elytral striæ are punctured almost as in S. planiceps, except that close to the lateral margin the striæ and puncturation alike become feeble. In S. oblongus (and presumably in abbreviatus) moreover the external teeth of the front tibiæ should be shorter than in procesus, whereas in the example of obscuripes before me they are longer than in either sex of procerus. In S. foveiceps, Macl., inter alia, the structure of the legs is said to be as in S. rugiceps, in which case the front tibiæ are very much wider than in S. obscuripes. From all the described species, unless foveiceps, the present insect seems to differ in the dark colour of its legs. There seems to have been some ambiguity in the terms employed to describe the external dentation of the anterior tibiæ in Scolyptus; the apical external extension of the tibia itself apparently having been by various authors excluded in numbering the teeth.

In calling the anterior tibiæ of the present species "tridentate" externally, I have included the curved produced apex of the tibia itself,—as is usual in characterizing species of *Carenum*, &c.

Burrundie, N. Terr, of S. Australia; taken by Dr. Bovill.

PHYSOLESTHUS PALLIDUS, Sp.nov.

3. Sat angustus; obscure testaceus, elytris piceo - umbratis; -capite inter oculos transversim depresso, hoc prothoraceque subcoriaceis haud distincte punctulatis; prothorace transverso; elytris leviter striatis, interstitio 3° 2-punctulato.

[Long. 21, lat. 4 lines.

The prothorax is nearly half again as wide as long, the front margin equal in width to the base, the dorsal channel very feeble; the hind angles are obtuse, the reflexed lateral margins not very wide in front but near and around the hind angles becoming extremely so; along the front margin are some fine longitudinal wrinkles. The piceous clouding of the elytra is chiefly about the suture and apex, and is very little defined. It is just possible that the sudden transverse flattening of the head between the eyes may be a malformation,—but as it is quite symmetrical its presence is more likely to be normal.

Of much smaller size and lighter colour than *P. australis*, Chaud., and *suturalis*, Cast. Compared with *P. grandipalpis*, Macl., it would seem *inter alia* to be considerably smaller, with the elytra much more feebly striated,—besides differing in colour.

S. Australia; Murray Bridge.

LECANOMERUS FLAVOCINCTUS, Blackb.

It is possible that this species is identical with *L. insidiosus*, Chaud., but unfortunately the latter has not been described, M. de Chaudoir having merely stated its size and colour, and compared it with *Stenolophus proximus*, Dej., a species I do not possess. If errors occur through such useless descriptions the author of the latter must be held responsible.

Notophilus.

When I characterized this genus (Tr. Roy. Soc. S.A., 1887, p. 185), I omitted to state that the 2nd joint of the labial palpi is bi-setose, as in *Lecanomerus* and *Thenarotes*. In *Haplaner* also the same joint is bi-setose.

LAMELLICORNES.

COPTODACTYLA BAILEYI, sp.nov.

Q (!).—Nigra; nitida; convexa; oblongo-cylindrica; capite (vertice lævi excepto) transversim rugulato; clypeo antice rotundato; prothorace angulos anticos versus punctulato, antice utrinque a foveola laterali usque ad angulos anticos carinato; elytris crenatostriatis, punctis latera versus minoribus, stria nona simplici et ante medium in margine laterali desinente; pygidio convexo, lævi; tibiis anticis brevibus, apice acuminatis, externe inermibus.

[Long. 6, lat. 4 lines (vix).

Extremely like *C. glabricollis*, Hope, but different from it in the clypeus being evenly rounded in front without any emargination whatever, and in the front tibiæ being very short, narrowed to a sharp point at the apex and unarmed externally. The front legs are devoid of tarsi in the example before me, but it is just possible these may have been broken off.

Queensland, Mount Bellenden-Ker; taken by Mr. F. M. Bailey.

Novapus laticollis, sp.nov.

Latus; sat nitidus; subtus dense rufo-hirsutus; prothorace basin versus angustato, margine basali integro; elytris sub-punctulato-striatis.

Maris capite cornu lato, apicem versus recurvo, apice leviter dilatato et emarginato; prothorace (quam longiori partibus duabus latiori) a basi ad apicem profunde excavato, partis excavatæ lateribus perpendicularibus, fundo lævgiato vel vix sculpturato.

[Long. ($\mathcal{J} Q 10\frac{1}{2}$, lat. $\mathcal{J} 6$, $Q 5\frac{1}{2}$ lines.

From N. Adelaidæ, Blackb., this species differs in being proportionately much wider,—less than twice as long as wide (of both species I have seen a good many specimens which do not appear to vary in proportions); from N. striatopunctulatus, Blackb., in

the sculpture of the elytra; from both it differs in the very much larger and deeper excavation of the prothorax in the 3, a difference somewhat difficult to express in specific terms, but the following will perhaps avail:-the perpendicular depth of the excavation is as great as its greatest width (in the other species much less); if the excavation be examined by looking along the insect (longitudinally) from behind, the specimen being held so that the eye has the base of the prothorax just exactly covering the apex of the same (beyond which the frontal horn rises), the outline of the excavation appears as an exact semicircle (or even slightly more than a semicircle) while in the other species it is much less than a semicircle; it also differs from both the above-named species in the almost perfect smoothness of that portion of the surface of the prothorax which falls within the excavation (such sculpture as there is consisting in very minute and sparse granulation); the same part in Adelaidæ and striatopunctulatus being reticulately strigose. The female does not differ notably from that of N. Adelaidæ except in its wider proportions. The female of N. striatopunctulatus is unknown.

From N. simplex, Shp., the present species differs in its frontal horn being notched at the apex, and from N. crassus, Shp., in the prothoracic excavation not being in the smallest degree "rugulosely punctulate."

N. crassus, Shp., differs in toto from the two species of which the female is known to me by the characters of that sex, which include a tubercle on the head and an excavation on the prothorax. Is it possible that Dr. Sharp may be mistaken in regarding this insect as Q Novapus? The question is suggested by the fact that for a long time (and until positive information enlightened me) I regarded as the Q of N. Adelaidæ an insect which has a tubercle on the forehead and a gentle excavation on the front of the prothorax, but which I have since ascertained to be certainly not Novapus (I believe it to be Semanopterus subæqualis, Hope).

If this might be so my N. Adelaidæ would be very near N. crassus, Shp., but would appear to differ from it in its much

narrower proportions,—no specimen that I have seen being shorter than twice its width, as well as in the interior surface of the prothoracic excavation in the male not being rugulosely punctulate.

Near Eucla, W. Australia; taken by Mrs. Graham.

CAVONUS ARMATUS, Shp. Q.

Among a small batch of *Cavonus armatus*, Shp., recently sent to me by Mr. McDougall of Moonta were two females, which had been dug up from the ground. This sex differs from the male in the following characters;—the club of the antennæ is very much smaller being shorter than the preceding joints taken together; the surface of the prothorax is quite even, that part which in the male is excavated being very distinctly but not very closely punctulate;—the rest lævigate or nearly so; the pygidium is much less abruptly declivous and less strongly fringed with hairs above.

PHYLLIOCEPHALA, gen.nov. (Corynophyllo affinis).

3.—Mentum sat angustum, elongatum, antice gradatim angustatum (fere ut Corynophylli). Palpi labiales articulo ultimo sat valido, obconico (quam Corynophylli paullo breviori). Maxillæ lobo superiore parvo (fere ut Cavoni). Palpi maxillares articulo 2° sat incrassato, articulo ultimo sat elongato fortius incrassato, subovato (quam Cavoni Corynophillive multo magis incrassato). Mandibulæ haud prominentes. Labrum vix perspicuum. Antennæ 10-articulatæ, flabello elongato minus lato. Caput cornu valido acuto instructum, ante oculos utrinque fortiter (quam Cavoni Corynophyllive multo magis fortiter) dilatatum, antice declivum. Prothorax (fere ut Cavoni) profunde excavatus utrinque sat fortiter elevatus sed haud antice cornutus. Tibiæ anticæ obtuse tridentatæ; posteriores sat graciles, apice truncatæ ciliatæque. Tarsi graciles, tibiis fere longiores. Stridulationis organa nulla.

Q. Latet.

The superficial resemblance of this genus to Cavonus is quite remarkable,—so much so that when I first saw it I passed it over

as being *C. armatus*, Shp. On examination, however, its horn (which is quite like that of *C. armatus*) is seen to be on the *head* (not on the front of the prothorax), the lateral dilatation of the head in front of each eye to be much larger (giving the head some resemblance to the shape of a trilobed leaf), the flabellum of the antennæ to be wider, the mentum to be much narrower, and the apical joint of all the palpi to be much stouter.

From *Neocavonus* the present genus differs *inter alia* in the shape of its mentum, in the apical joint of its maxillary palpi not truncate (or scarcely so), in the absence of a prothoracic and presence of a frontal horn, and in the much larger flabellum of its antennæ.

From Aneurystypus it differs inter alia in the proportionally much wider mentum, in the much shorter and stouter apical joint of the labial palpi, in the much smaller flabellum of the antennæ, and in the absence of a prothoracic and presence of a frontal horn.

From Corynophyllus it has been distinguished in the Latin diagnosis (above).

From Teinogenys (which I do not think that I have seen) it would seem to differ inter alia in the mentum not being "compressed."

From all the above genera the extremely strong dilatation of the head on either side in front of the eyes would seem a sufficient distinction.

PHYLLIOCEPHALA NIGRO-HIRTA, sp.nov.

3.—Nitida; nigerrima; supra glabra, corpore subtus pedibusque longe sat dense nigro-hirtis; clypeo antice rotundato, marginibus fortiter reflexis; capite cornu valido, recurvo, apice sat acuto, antennarum flabello vix breviori, instructo; prothorace quam longiori plus dimidia parte latiori, a margine antico fere ad basin profunde excavato, sparsim subtilius punctulato, partis excavatæ lateribus angulatim elevatis fundo transversim strigato; scutello antice punctulato; elytris (stria suturali punctulata, et

basi vage sparsim punctulata, exceptis) sublævigatis; pygidio leviter squamose punctulato, medio longitudinaliter sat anguste lævigato. [Long. $8\frac{1}{2}$, lat. $4\frac{4}{5}$ lines.

Near Eucla, W. Austr.; taken by Mrs. Graham.

NEOHETERONYX, gen.nov. (Heteronyci affinis).

Heteronyce differt mento fortiter convexo, minus lato; palpis maxillaribus gracilibus elongatis; maris tarsis anticis intermediisque sat fortiter dilatatis.

So many of the characters that have been relied upon as generic in the *Melolonthidæ* (e.g., the number of joints in the antennæ) have been found unreliable when fresh species have been discovered, that I think it better to assume the possibility of a like uncertainty of character in this genus, and to characterize it merely by the salient points mentioned above. The following will probably be found to be also generic characters,—although some of them may perhaps eventually prove to be merely specific.

Antennæ 8-jointed, club consisting of 3 joints, each of which is (in both sexes) nearly as long as the preceding four joints together. Labrum horizontal, altogether below the level of the clypeus, but distinctly visible (owing to its forward projection) if the clypeus be looked down upon from a point perpendicularly above its surface. Eyes large, entire. Clypeus moderately reflexed, its sides not at all convergent hindward immediately in front of the eyes. Hind coxæ on the external margin even shorter than the 2nd ventral segment,—their external hind angle quite rounded off. Front tibiæ of male (i.e., of the sex with dilated tarsi) bidentate externally, of female simple; claws appendiculate, the basal piece strongly compressed, the apical piece as long as the basal, and slender. The pygidium is exposed.

N. LIVIDUS, sp.nov.

Oblongus; subglaber, pygidio, pedibus segmentisque ventralibus pilis sparsim vestitis; brunneo-lividus, capite prothorace

tarsisque maculatim infuscatis, pedibus antennisque testaceis; sat fortiter sat crebre (elytris sublineatim) punctulatus.

[Long. $2\frac{3}{5}$ (vix), lat. $1\frac{1}{5}$ lines.

The head is longer and scarcely narrower than the prothorax, which is twice as wide as long, its base (which is scarcely bisinuate and but little lobed hindward in the middle) being very little wider than the front, which is moderately concave, with angles moderately sharp and not much produced; the hind angles are fairly distinct but not at all sharp. The general facies is very similar to *Heteronyx*, though the head looks disproportionately large.

N. Territory of S. Australia; taken by Mrs. Bovill.

BUPRESTIDÆ.

ASTRÆUS MASTERSI, Macl.

There seems to be no doubt that this is identical with A. Samouellei, Saund. The species is a very distinct one, and the descriptions are almost word for word the same. A. pygmæus, Poll., does not appear to differ except in the absence of the subapical yellow spot on the elytra. The author seems to have some doubt as to the specific value of his name. I have not myself seen a specimen without the sub-apical spot; but as some of the other spots undoubtedly vary, I should hesitate much to regard A. pygmæus as more than a var., especially as in the following species I find a precisely similar variation.

A. MEYRICKI, sp.nov.

Nitidus; postice ab elytrorum basi fortiter angustatus; læte cupreus, capite prothoraceque obscurioribus vel virescentibus, hoc certo adspectu cyanescenti, elytris flavo-bifasciatis (fasciis suturam haud admodum attingentibus, anteriori sat angusta vix ante medium posita, posteriori paullo ante apicem magis etiam angusta) et maculis binis flavis ornatis (harum altera ovali longitudinaliter ad basin in interstitio 3º posita, altera lineari inter fasciam posteriorem et apicem posita); subtus sat dense argenteo-pubescens;

capite (hoc longitudinaliter sulcato) prothorace et corpore subtus sat dense subrugulose punctulatis; elytris fortiter anguste 11-costatis, interstitiis latis subconcavis seriatim punctulatis; antennis tarsisque cyanescentibus.

[Long. $4\frac{4}{5}$ - $5\frac{3}{5}$, lat. 2 (vix)- $2\frac{2}{5}$ lines.

Var. Elytrorum fascia posteriori in medio anguste interrupta, macula subapicali deficienti.

The prothorax across the base is about three times as wide as the length from its apical margin to the front of the projecting elytral lobes, and is quite twice as wide at the base as in front. Each elytron at the sutural apex forms a very strong sharp process curved outward, above which externally is a much smaller but equally sharp process also directed outward. The apical dehiscence of the elytra commences scarcely above the upper spine. The 2nd, 3rd, 4th, and 5th costæ on the elytra are very oblique, terminating on the 1st costa at successively greater distances down its length.

Seems to resemble Conognatha navarchis, Thoms., (from Tasmania),—which I should judge from the description to be an Astreus,—but appears to differ from it as follows:—the size of A. Meyricki is very much less than of C. navarchis, the basal and sub-apical elytral spots appear to be wanting in the latter, and the anterior fascia reaches the suture. In C. navarchis the labrum is said to be pale yellow and the tarsi to be brown, there is no mention of the quite dense silvery pubescence which clothes the underside of A. Meyricki, and the forehead is said to be carinated. No doubt there are other differences, as the description of C. navarchis is very incomplete, not mentioning (e.g.) the position of the fasciæ on the elytra or the presence of any costæ on the same. Probably the yellow elytral markings (which are of a pale sulphur hue) are subject to considerable variation.

W. Australia; taken by E. Meyrick, Esq.

A. MAJOR, sp.nov.

Subnitidus; postice minus angustatus; æneus plus minus cupreo- (vel violaceo-) micans, femoribus tibiisque plus minus

testaceis, elytris flavo- 3-fasciatis (fascia 1 basali sat angusta, 2ª latiori sola suturam admodum attingenti paullo ante medium, 3ª sat angusta ab apice sat procul) et macula elongata sanguinea subapicali ornatis, lateribus quoque maculatim sanguineis; corpore subtus latera versus argenteo-pubescenti; capite (hoc sat convexo) prothorace et corpore subtus (abdomine vix ruguloso excepto) crebre rugulose punctulatis; elytris fortiter striatis, striis subtilius punctulatis, interstitiis sat convexis sparsim sat fortiter punctulatis; antennis tarsisque viridibus vel cyaneis.

[Long. 7-8, lat. $3-3\frac{1}{2}$ lines.

The prothorax across the base is distinctly less than three times as wide as the length from its apical margin to the front of the projecting elytral lobes, and is not quite twice as wide across the base as in front. Each elytron is spined at the apex scarcely differently from those of the preceding species, but the elytra begin to diverge further from their apex, so that the sutural spines are more widely separated. The 6th stria meets the sutural stria at its apex enclosing the 2nd, 3rd, 4th, and 5th. The sanguineous portions of the lateral margins are identical with the lateral margins of the fasciæ, with the addition of that portion of the lateral margin which lies between the basal and antemedian fasciæ. All the femora and tibiæ are testaceous (with a coppery gloss) in one of the examples before me, in the other example all the knees and the hind femora are suffused with an æneous tone that obscures the testaceous appearance. The sides of the elytra are somewhat concave behind the shoulders, bulging out again slightly to about the middle, whence they are gradually convergent to the apex.

S. Australia; an example in my own collection, and one taken by Mr. J. G. O. Tepper at Monarto on Eucalyptus flowers.

A. TEPPERI, sp.nov.

Subnitidus; postice minus angustatus; niger plus minus æneotinctus, elytris singulis 8-maculatis; corpore subtus sat dense argenteo-pubescenti; capite (hoc sat convexo) prothorace et corpore subtus crebre aspere (prothorace ad latera magis rugulose) punctulatis; elytris ut A. Meyricki sculpturatis, his nihilo minus apice magis dehiscentibus. [Long. $3_5^3 \cdot 4_5^4$, lat. $1_5^3 \cdot 2$ lines.

The shape of the prothorax and elytra is as in A. major, the surface sculpture of the latter (i.e., the elytra) being quite as in A. Meyricki. The yellow spots on each elytron are as follows:—an elongate quadrate spot close to the base extending transversely from the 2nd to the 5th costa, a transversely oval spot from the 1st to the 5th costa a little in front of the middle, a much smaller spot just behind the middle and in a line with the preceding two, another (also small) in the same line and much nearer to the 3rd spot than to the apex, three spots (all about equal in size to that first named) on the lateral margin opposite the interstices between the 1st and 2nd, 2nd and 3rd, and 3rd and 4th dorsal spots, and one (a little before the apex about half way across the elytron) which might be regarded as belonging to either the dorsal or marginal series.

This species bears in the Adelaide Museum the name I have given to it, but I cannot find any published description.

S. Australia; said to occur on flowers of *Melaleuca parvifolia* in the neighbourhood of the Murray.

ELATERIDÆ.

ALAUS DARWINI, sp.nov.

Angustus; sat parallelus; sat convexus; nigro-piceus; supra pilissquamiformibus (alteris albidis, alteris nigro-fuscis) dense tectus, his utriusque coloris maculatim condensatis, maculis in prothoracis disco utrinque, et in elytris (his basi utrinque sanguineis) latera versus, præcipue perspicuis; subtus dense sat æqualiter albido-pubescens; pedibus antennarumque basi plus minus rufescentibus; capite prothoraceque fortiter crebrius punctulatis (puncturis sub pilis abditis); illo antice leviter concavo; hoc tumido, quam latiori fere tertia parte longiori, lateribus leviter arcuatis, basi quam margo anticus fere dimidia parte latiori; elytris leviter punctulato-striatis, apice vix emarginato-truncatis, scutellum versus utrinque

sat tumidis, striis (et in striis puncturis) a basi ad apicem gradatim obsolescentibus, interstitiis subtiliter minus crebre, basin versus confertim sat aspere, punctulatis. [Long. 8½, lat. 2½ lines.

The prothorax is very convex in all parts, being strongly declivous at both sides and ends; its most abrupt declivity is behind but (except as that makes it so) it can hardly be called tumid or tuberculate in front of the scutellum; on a casual glance the prothorax appears subcylindrical and parallel, but on more careful inspection it is seen that the sides in their middle part are gently rounded, thence considerably and roundly convergent at the extreme front and also convergent close to the base, but divergent again at the posterior angles which are considerably produced and very sharp; there is a lævigate line down the middle. The scutellum is of the form of a mitre and is placed on the face of an abrupt declivity similar and opposite to the hind declivity of the prothorax, there being on the latter two vague impressions corresponding in position to the two tumidities which are placed one on either side of the scutellum. The example before me is evidently a little abraded, but it is clear that a fresh specimen would be densely clothed with scale-like pilosity entirely hiding the sculpture from view. On the head and prothorax this pilosity is for the most part white or greyish-white, and on the latter there are blackish-brown masses of pilosity almost confined to the middle part of the segment (apparently along its whole length); this dark pilosity is most conspicuous where it assumes the form of an almost round and well limited spot on either side of the middle line a little nearer to the front than to the base,behind which and about half way to the base is a similar but smaller spot on either side of the middle line. My unique example is glabrous down the middle line, and if this be the result of abrasion it is probable that in a perfectly fresh specimen these discoidal spots of the prothorax may be connected by continuous pilosity with a strip of blackish pilosity running down the middle line of which they would perhaps appear as lateral extensions merely. On the elytra the most conspicuous marking appears to be a space covered with black pilosity commencing on the lateral

margins immediately in front of the middle and running in a fascialike form towards the suture, before reaching which, however, it turns upward and runs forward towards the scutellum; it is edged before and behind, close to the lateral margin, by the whitest part of the elytral pilosity; a fascia of blackish pilosity traverses the elytra a little before the apex; the elytra are bright red at the base (much as in Monocrepidius Australasiae) but the redness being of the derm it is almost unnoticeable beneath the whitish pilosity. Probably in a perfectly fresh specimen the elytra are decidedly whitish with the sutural region for the most part darker and sending out (a) a festoon-like ramification on either side from near the scutellum to the middle of the lateral margin, (b) a fascialike ramification on either side near the apex. The elytra are not symmetrical in the example before me, one of them being almost evenly rounded at the apex,—the other decidedly though lightly emarginate-truncate.

N. Territory of S. Australia; taken by Dr. Bovill.

N.B.—Sir William Macleay (Proc. L.S.N.S.W. 1888, p. 1240) mentions an *Alaus* from King's Sound which he regards as a var. of *A. funebris*, Cand., distinguished by smaller size and the presence of two round black spots on the prothorax. The distinctive characters mentioned are certainly suggestive of the present insect, which on the other hand is far too different from *funebris* to be regarded as a var., the prothorax (e.g.) in *funebris* being laterally dilated behind the front, with a bi-angular projection anteriorly and a strong tubercle in front of the scutellum.

BOSTRYCHIDÆ.

Species of this family seem to be rather numerous in Australia although very few have been described,—viz., 3 species attributed in Masters' Catalogue to Bostrychus, 4 to Rhizopertha, and one since referred to a new genus,—Apatodes. B. Jesuita, Fab., appears to be a genuine Bostrychus. Concerning the generic characters of the four described by Sir William Macleay, there is no information beyond their author calling two of them Bostrychus, and 2 Rhizopertha. The species described by Germar and

Erichson are called *Apate* by their authors, and I am not aware on what ground Mr. Masters has referred them to *Rhizopertha*. I am myself the author of *Apatodes*.

The four species of Sir W. Macleay are from Queensland, and all appear to have strongly marked elytral sculpture differing widely from that of any species known to me. Apate collaris, Er., is described as a small species with the elytra retuse-truncate and bidentate behind, and the prothorax of a bright red colour; I shall refer to it again below. A. obsipa, Germ., appears to be a remarkable insect having opaque pilose elytra, and is one of the few of Germar's Australian species not known to me.

The following species are from S. Australia.

The first of them and A. collaris, Er., may, I think, be attributed to Apate. They present the following characters which are almost identical with those attributed to Apate by M. Lacordaire, viz.,—head invisible from above; antennæ of 10 joints, joints 1 and 2 being together about as long as 3-7 together, joints 8-10 serrated (8 and 9 transverse) together about equal to the preceding 7 together in length; tarsi slender and elongated, joints 2 and 5 much longer than the rest; elytra retuse behind, variously spined. The next two species may perhaps for the present stand in the genus Xylopertha as characterized by M. Lacordaire, in common with which they present the following characters,-head invisible from above; antennæ of 10 joints, 1 and 2 being together about as long as 3-7 together, joints 8-10 together considerably longer than the preceding 7 together, 8 and 9 nearly as wide as long, apical joint elongate-cylindric, nearly as long as the preceding two together; of the tarsi joint 5 is longest, 2 and 3 nearly equal and each a little shorter than 5, joints 1 and 4 short, elytra behind simply retuse. The following characters are peculiar and would perhaps justify a new generic name for the species presenting them,—(a) posterior 4 tarsi strongly compressed, so that viewed from above they appear excessively slender-almost hair like, (b) sexual characters strongly defined, one sex (no doubt the male) of at least one species having anterior tarsi clothed

moderately thickly all over with very long and very fine hairs, elytra sculptured in the apical part differently from those of the other sex, and the form much narrower and more elongate in respect of both the prothorax and the elytra.

APATE LINDI, sp.nov.

Nitida; glabra; picea, capite prothorace pedibusque rufis, elytris hic illic rufescentibus; capite crebre ruguloso; prothorace elytrorum latitudine, leviter transverso, postice leviter sparsim sat crasse punctulato, antice fortiter tuberculato-ruguloso, utrinque ad marginem lateralem antice spinis 3 conspicuis (harum antica maxima uncinata) armato, basi quam antice fere duplo latiori, angulis posticis rotundatis; elytris prothorace plus duplo longioribus, sat crebre (a basi ad apicem gradatim magis fortiter et magis crasse, pone medium valde rugulose) punctulatis, postice declivibus, parte declivi haud carina circumcincta, utrinque spinis 2 (spina superiori parva compressa, inferiori permagna retrorsum directa intus fortiter curvata) armata, sutura a basi ad apicem gradatim magis elevata, humeris lævibus.

[Long. 1-2, lat $\frac{3}{10}$ - $\frac{5}{2}$ lines.

Viewed from the side both the apical spines of the elytra are seen to project horizontally hindward; viewed from above the upper (and smaller) spines, which are considerably nearer to each other than the lower ones, are seen to be almost parallel,—while the lower ones (which are more than twice as long as the other pair and are about as long as the non-rugulose portion of the prothorax on the middle line) curve in a convergent direction so that their apices are not so far apart as the apices of the upper pair of spines. Immediately below the large spine and a little nearer to the lateral margin is a third prominence which however is small, very obtuse and little conspicuous.

Port Lincoln, S.A.; cut out of burrows in a living Eucalyptus.

A. collaris, Er.

I possess an example which I believe to be this insect; I cut it out of a burrow in a living Eucalyptus on Mount Lofty near

Adelaide. It agrees very well with Erichson's description, and is certainly not a *Rhizopertha* but may well stand in *Apate*, where its author placed it. An example taken by Mr. J. Anderson at Port Lincoln, is narrower and more elongate than that just referred to; I take this difference to be sexual; the elytra moreover are not rufescent at the base as in Erichson's description and the Adelaide specimen. In both these I find the slightest possible indication in some lights of two or three costæ (not mentioned by Erichson) running down the elytra.

XYLOPERTHA MYSTICA, sp.nov.

3. Elongata; cylindrica; sat nitida; glabra; picea, antennis palpis tarsisque testaceis, femoribus tibiisque rufescentibus; capite sat elongato, longitudinaliter sat crebre strigato, antennis prothorace vix brevioribus; prothorace elytrorum latitudine, quam latiori fere longiori, antice sat angustato, postice subtilius sparsim conspicue punctulato, antice crebre granulato-ruguloso tuberculis nonnullis majoribus intermixtis (præcipue latera versus), utrinque unco supra oculum haud armato; elytris crebrius fortius vix rugulose (apicem versus vix magis fortiter) punctulatis, postice minus abrupte declivibus, apice singulatim valde productis et intus acute angustatis, parte declivi ad latera carinata et utrinque concava, sutura antice plana in parte declivi sat fortiter carinata, apice minute spinoso-producta, humeris lævibus; tarsis posterioribus 4 gracilibus compressis, supra visis fere capilliformibus, tarsis anticis perlonge pilosis; tibiis anticis subtus minute denticulatis.

[Long. 14, lat. 2 lines.

The non-declivous portion of the elytra is quite twice as long as the declivous part. The denticulations under the front tibiæ are scarcely noticeable without the aid of a compound microscope.

In company with the specimen described, I found an example which I have no doubt was the female of the same species, but unfortunately I broke it to pieces in trying to examine its mouth organs. It differed from the male in being a much shorter and wider insect with the front tarsi not pilose, and

the posterior declivity of the elytra larger, more strongly defined, and quite flat; the posterior declivous part of the elytra was produced downwards beyond the level of the undersurface of the body (as in the male) but the elytra were conjointly rounded or perhaps somewhat angulated at the apex, not as in the male separately mucronate at the extremity with the suture itself produced as a small spine projecting into the triangular gap between the apices of the elytra. It was superficially so distinct from the male that its connection with it would probably not have suggested itself if I had not taken the two specimens out of similar burrows in the same piece of wood, but the two when placed side by side agreed in many striking characters, having identical antennæ, and sculpture of all parts, together with the somewhat unusual absence of a hooked spine on the front margin of the prothorax, and the very unusual structure of the posterior 4 tarsi and production downwards of the apex of the elytra.

S. Australia; dug out of burrows in wood of a living tree at Petersburg.

XYLOPERTHA VIDUA, sp.nov.

Modice elongata; sat nitida; glabra; picea, antennis palpisque testaceis, pedibus rufescentibus; capite sat elongato longitudinaliter sat crebre strigato, antennis prothorace vix brevioribus; prothorace elytrorum latitudine, quam longiori vix latiori, postice sparsim conspicue subtilius punctulato, antice crebre fortiter granulato-ruguloso, antice ad latera utrinque 3-spinoso (spina antica alteris majori uncinata), basi quam margo anticus fere duplo latiori; elytris creberrime sat fortiter ruguloso-punctulatis, inter sculpturam fortiter rugatis, postice minus abrupte declivibus, parte declivi plana fere circulari, haud perspicue carina circumcincta, apice deorsum producta, sutura antice vix perspicue (in parte declivi sat fortiter) cariniformi; humeris lævibus; tarsis posterioribus 4 gracilibus compressis, supra visis fere capilliformibus: tibiis anticis subtus vix denticulatis.

[Long. 13, lat. 3 line (vix).

The example before me is clearly, I think, the female of a species closely allied to the preceding. I am departing from my usual practice in founding a description on the female only of an insect that probably presents strong sexual characters, because the present specimen is the only female I possess of this probably new genus, and it is desirable that both sexes should be described. X. vidua differs from X. mystica in the very much stronger and more rugulose sculpture of the elytra (which appear coarsely shagreened rather than punctured) and in the presence of a strong hooked spine on either side of the front margin of the prothorax above the eye.

The declivous portion of the elytra is nearly as long down the suture as the non-declivous portion; it is inclined at an angle of about 45° to the non-declivous portion, and has a nearly flat or slightly convex surface interrupted only by the carinated suture.

S. Australia; taken near Port Lincoln by beating branches of trees.

TENEBRIONIDÆ.

PTEROHELÆUS RAUCUS, sp.nov.

A remarkably fine and distinct species of the same group as *P. Walkeri*, De Brême, which it resembles in shape, but the extradiscal portion of the prothorax is concave (the lateral margins being bent upward), and of the elytra wider (though much less conspicuously separated from the disc owing to the granulation of the latter being continued uninterruptedly almost to the actual lateral margin). The antennæ set back reach distinctly beyond

the apex of the scutellum. With the exception of some almost obsolete punctures on the head, the entire upper surface is devoid of puncturation even under a strong lens. The granules on the elytra are rather closely set throughout (most so near the suture), and have a general tendency to a linear arrangement, here and there some granules (more or less exceeding the average in size) running in well defined longitudinal rows; the most conspicuous of which are one about the middle of the disc (which is quite obsolete near the apex) and another half-way between it and the suture (this latter row being obscurely continued almost to the apex). The extreme margins of prothorax and elytra are a little rufescent. The elytra at the extreme apex are dehiscent and separately end in an obtuse point, but this may not be always the case as they are not quite symmetrical in the example before me.

N. Territory of South Australia; taken by Dr. Bovill.

HELÆUS ELONGATUS, sp.nov.

Parallelus; elongatus; glaber; nitidus; subtus fuscus, supra nigricans, marginibus supra et subtus læte testaceis anguste nigro limbatis; his supra (sub lente forti) minute nec crebre granulatis; prothorace postice tuberculo conico acuto instructo, foramine quam longiori parum latiori; elytrorum disco subseriatim sat fortiter nec crebre punctulato, tuberculorum seriebus septenis instructo, seriebus alternis antice abbreviatis, seriei marginalis tuberculis majoribus subspiniformibus, sutura valde cariniformi.

[Long. $13\frac{1}{2}$, lat 7 lines.

Resembles *H. pallidus*, Macl., (of which I have an example named by its author) but narrower and more parallel. It differs also in the right-hand anterior projection of the prothorax being above the left-hand projection at the apex (I am not at all sure of the value of this character), and in the space enclosed by the anterior projections of the prothorax being scarcely wider than long; the elevation in front of the middle of the base of the prothorax is less spiniform,—resembling a sharp conical tubercle

rather than a spine. The elytra are very differently sculptured, their puncturation being about equally strong but less close and having a tendency to a sublinear arrangement especially behind,—this sublinear puncturation taking the form of longitudinal strips of punctures (the punctures in which are confused inter se) separated from each other by longitudinal levigate or sublevigate strips; the longitudinal rows of small tubercles on the elytra, in the outermost of which the tubercles are replaced by stout little spines, at once distinguish this insect from H. pallidus, and the colour is different. This species doubtless also resembles the enigmatical H. princeps, Hope, but appears to be considerably smaller and much narrower and more parallel, with the dilated margins of the prothorax and elytra differently sculptured.

It should be noted that the narrow external black edging of the dilated marginal portion is continued along the base of both prothorax and elytra. The bright testaceous colour of the dilated margin, in strong contrast with the black disk and narrow outer edging of black, makes this a very conspicuous species.

Eucla, W. Australia; in the collection of Mr. J. Anderson.

HELÆUS CONSULARIS, Pasc.

Mr. Anderson's collection contains a specimen which I think must appertain to this species; it was taken at Eucla. It is very like H. moniliferus, Pasc.,—as H. consularis is said to be,—and differs from the former exactly as consularis is said to do except in respect of the reflexed margins which according to description should be strong in consularis and feeble in moniliferus, whereas to me it appears that they are strong (about equally so) in both species. This is certainly puzzling, but I can hardly think it likely that I can have two undescribed species before me both closely allied to moniliferus and consularis,—and that Sir W. Macleay is also wrong in his identification of the former,—as would appear to be the case if Mr. Pascoe's descriptions are strictly accurate in respect of the reflexed margin. I think it more probable that Mr. Pascoe's description of H. moniliferus was founded on an

abnormal specimen. Besides the characters distinguishing *H. consularis* from *H. moniliferus* that Mr. Pascoe mentions, it may be noted that the example of the former before me is more convex than its ally, and has the flattened margin of the elytra narrower and less horizontal while the shoulders of the same are less produced forward.

SARAGUS RUGOSUS, Boisd.

I have lately received from Mr. Duboulay an example (taken in Victoria) of a Saragus which seems very likely to be this species. The description is too brief to allow of certain identification, but as the species before me presents the characters mentioned by Boisduval, and does not seem to have been described under any other name, I think Boisduval's name may be assigned to it It is exceedingly closely allied to S. lævicollis, Fab., from which it differs as follows:—it is smaller (long. $6\frac{1}{3}$, lat $2\frac{1}{2}$ lines), the costæ and tubercles on the elytra are evidently stronger (the latter being more numerous and more conical), both prothorax and elytra are considerably more widely margined, and the tooth at the external apex of the anterior tibiæ is much smaller.

Of the allied species subsequently described the present insect differs from S. Odewahni, Pasc., catenulatus, Macl., rudis, Macl., inæqualis, Blackb., Lindi, Blackb., latus, Blackb., and mediocris, Blackb., by its non-granulate prothorax, the sculpture of that segment being quite as in S. lævicollis.

TRICHOSARAGUS, gen. nov.

Sarago affinis, sed differt corpore pilis (supra perlongis erectis, subtus brevioribus minus erectis) densissime vestito; prothorace sat anguste, elytris nullo modo, ad latera dilatatis; mesosterno antice vix concavo; prothoracis tibiarumque anticarum et intermediarum marginibus externis fortiter serratis.

I feel some little uncertainty as to the real affinities of the remarkable insect I am now describing, as I know of nothing to

which it is closely allied. In some respects it would seem to resemble certain Hopatridæ (e.g. Cadius and Sobas), but I think the dense villosity clothing the tarsi beneath, the absence of the clypeal excavation so usual in that group, and the long dense villosity of the general surface, are characters that could hardly combine in a Hopatrid. The vestiture is not unlike that of Ectyche (though it is considerably longer and more dense) in Helopidæ, but many characters (e.g., the head very deeply sunk into the prothorax) at once shows this to be a mere accidental analogy. On the whole I have little doubt that it is to Saragus the present insect is really related.

The general form is sub-globular, the length of the whole insect being something less than half again its greatest width, and its height (i.e., distance through the body from centre of metasternum to opposite point on elytra) is nearly half its length,—so that in shape it resembles a Chrysomelid (say Augomela hypochalcea, Germ.). The mentum is feebly carinated longitudinally. The clypeus is strongly transverse, its free margin continuously reflexed, its anterior outline sub-sinuate. The eyes in repose are quite invisible from above. The antennæ resemble those of Saragus. The border of the prothorax is narrowly flattened,somewhat as in Nyctozoilus, but the actual margin is scarcely thickened and is evenly serrate along its whole length. elytra are soldered together; their margin is quite as feeble as in Nyctozoilus. The prosternum between the anterior coxæ is about as wide as in Saragus, and arches down behind without any process properly so called, the opposite face of the metasternum being scarcely at all concave. The metasternum is quite short, and the epipleuræ of the elytra are flat and wide, -even more so than in Nyctozoilus. The legs are stout and shortish, the anterior tibiæ terminating in a curved sharp spur about equal in length to the basal four tarsal joints together. The basal joint of the hind tarsi is equal to the following two together and is evidently shorter than the apical joint. The rest of the characters appear to be as in Saragus.

T. PILOSELLUS, sp.nov.

Brunneo-testaceus, capite, prothorace, elytrorum costis, pedibusque, rufescentibus; capite prothoraceque subnitidis subtiliter nec crebre punctulatis, sat fortiter sat sparsim granulatis; illo quam longiori duplo latiori, basi quam margo anticus (hoc sat fortiter emarginato) paullo minus duplo latiori, angulis posticis acutis retrorsum directis, lateribus sat fortiter denticulatis; elytris opacis, confertim subtiliter rugulosis, squamis minutis cinereis tectis, singulatim fortiter tricostatis, costis postice abbreviatis, sutura plana nullo modo costata; corpore toto supra pilis perlongis cinereis sat crebre vestito. [Long. 3, lat. 2½ lines.

Yorke's Peninsula, under stones; taken by Mr. J. G. O. Tepper.

AMARYGMUS TARDUS, sp.nov.

Sat brevis; latus; convexus; minus nitidus; supra æneus, obscure cupreo-micans; corpore subtus, pedibus, antennisque nigris, tarsis subtus fulvo-hirtis; capite subtiliter, prothorace elytrisque minus subtiliter sat crebre, punctulatis, his crasse profunde 8-seriatim foveolatis; foveis opacis, subcyaneis anguste cupreo-circumcinetis; prothorace quam longiori paullo plus duplo (postice quam antice paullo minus duplo) latiori, latitudine majori ad basin posita.

[Long. 5\frac{1}{5}-6, lat. 3\frac{1}{5}-3\frac{1}{5} lines.

The puncturation on the head, prothorax and elytra is somewhat uniform, but becoming gradually a trifle stronger and less close from the head hindward; on the elytra it has no reference whatever to the seriate foveiform impressions, being quite similarly dispersed between the rows of these impressions and between puncture and puncture in each row. The impressions in each row are somewhat irregular in size, the largest however being in the hinder part of the elytra; they are most numerous in the row nearest the suture which contains about twenty-four of them. The elytra have not the faintest indication of striæ; their

shoulders are quite rounded off. The epipleuræ of the elytra are coloured as the upper surface. The whole undersurface is black with a faint bluish tone and is moderately punctulate with a by no means strong development of longitudinal wrinkles on the lateral portions of the ventral segments. To specify the convexity of the body it may be observed that the height (i.e., the distance from the highest point,—the insect being viewed from the side,—through the body to an opposite point on the surface of the sterna) is to the length of the body as 13 is to 30. The foveæ in the rows on the elytra are much larger than in A. convexus, Pasc.

Queensland; taken by Mr. F. M. Bailey on the Bellenden-Ker Ranges.

N.B.—This species has the mandibles bifid at the apex and so would appear to be a true *Amarygmus*. In shape it resembles *A. convexus*, Pasc., which moreover has similar mandibles and therefore must also be reckoned a true *Amarygmus*.

AMARYGMUS UNIFORMIS, sp.nov.

Sat elongatus; minus convexus; sat nitidus; supra obscure viridis, corpore subtus pedibus antennisque nigris; capite prothoraceque crebre subtiliter punctulatis; elytris punctulato-striatis, striis postice gradatim profundioribus, puncturis in striis apicem versus obsoletis; interstitiis subplanis, subtilissime punctulatis; prothorace quam longiori duabus partibus (postice quam antice fere duabus partibus) latiori. [Long. 6, lat. 3 lines.

An elongate-oval species with the shoulders of the elytra well marked, the humeral angle being acute and quite prominent. The punctures in the striæ on the elytra are strong and rather large except near the apex where they are almost obsolete, and close to the base where they are small though deeply impressed; in the 3rd stria there are about 14 punctures from the base to the point where they become very small behind the middle. The sculpture of the underside is very similar to that in A. tardus but

the longitudinal wrinkling of the ventral segments is more conspicuous. The "height" of the body (as defined in the description of *A. tardus*) does not exceed a third of the length.

The perfectly unicolorous dark blackish-green colour of the upper surface is quite identical in the three examples before me, and in itself distinguishes this species from any other known to me. The colouring of A. bicolor, Fab., must be somewhat similar, but that species is said to be "eneous" on the upper surface; the present species is not at all so. Unless the type can be referred to, A. bicolor cannot be positively identified as the description is quite insufficient.

The mandibles are those of an Amarygmus, but the facies is entirely of Chalcopterus.

Queensland; taken by Mr. F. M. Bailey on the Bellenden-Ker Ranges.

CURCULIONIDÆ.

POROPTERUS PRODIGUS, Pasc.

There is nothing in the description of this species to distinguish it from *P.* (Acalles) conifer, Er. If the two are distinct (as seems likely enough from the wide divergence of their localities,—Eclipse Island and Tasmania) they must be very closely allied. The description is in both cases fairly detailed; but I can find no point of difference whatever.

LONGICORNES.

TRITOCOSMIA DIGGLESI, Pasc.

This species appears to be identical with *T. atricilla*, Newm., described nine years previously.

PHYTOPHAGA.

AULACOPHORA AUSTRALIS, Blackb.

I have come to the conclusion that this insect is a variety of A. analis, Weber (described from Sumatra). I think the var.

perhaps deserves to be a named one, as it seems to differ from the type in having the tibiæ and tarsi (not black, but) fuscous-brown, the anterior two pairs being at the base scarcely darker than the femora. It is of course possible that if the original type from Sumatra could be referred to other differences might be found.

NEORUPILIA STIRLINGI, Sp.nov.

Modice convexa; subnitida; elytrorum ad apicem fortiter dilatata; nigro-viridis, subtus obscurior, capite (hujus parte posteriori, et antennarum articulis ultimis ferme 7, picescentibus exceptis) prothorace, pedibusque, testaceis; capite (hoc inter oculos longitudinaliter profunde breviter sulcato) et prothorace subtilissime sat crebre (nihilominus leviter vix perspicue), elytris confuse sat subtiliter sat crebre subrugulose, punctulatis; corpore subtus minus crebre strigoso-punctulato; metasterno postice et segmento ventrali penultimo (? alterutrius sexus soli) in medio impressis; segmentis dorsalibus ultimis 3 (? alterutrius sexus soli) ab elytris haud tectis.

[Long. 1²/₅, lat. ⁴/₅ line]

It is probable that I have before me only one sex of this species; unfortunately the half dozen examples have been fastened on cards with some kind of mucilage of so unyielding a character and so plentifully used that they are not easily cleaned for examination, and the one I have cleaned has suffered much damage in the process,—but I think nothing would be gained by similar treatment of the rest as it is probable that the sexes differ in the length of the elytra and in the antennæ, and in these respects I find no difference in the examples before me, which are probably males. The prothorax is by measurement nearly as long as wide (to a casual glance it appears even longer) and is scarcely narrowed in front; its sides are gently rounded. The elytra are twice as wide at the apex as at the base. The antennæ are moderately stout and reach back nearly to the apex of the elytra, their basal joint being elongate (reaching when extended laterally slightly beyond the outline of the eye) and nearly equal to the 2nd and 3rd joints together; the 3rd is twice as long as the 2nd. The metasternum is evidently (but not much) shorter than the prosternum. Compared with *N. viridis*, Blackb., (Trans. Roy. Soc. S.A., Vol. XI., p. 177), this species is larger and more robust, with the elytra much wider behind, and is coloured quite differently. The claws (as in *N. viridis*) have an obtuse rather large tooth at the base.

Adelaide; taken by E. C. Stirling, Esq., M.D., President of the Royal Society of S. Australia, an accomplished zoologist to whom I dedicate this interesting little species.

COCCINELLIDÆ.

CHILOCORUS BAILEYI, sp.nov.

Hemisphericus; nitidus; capite, antennis, palpis, corpore subtus, et pedibus, testaceis; prothorace nigro, lateribus late (et margine antico anguste undulatim) rufis; elytris totis nigris; capite prothoraceque leviter sat crebre, scutello elytrisque paullo fortius minus crebre, punctulatis; his ad humeros rotundatis, haud productis. [Long. 2^1_5 , lat. 2 lines.

Regarded from the side the upper outline appears as a very strong curve, its highest point being scarcely in front of the middle; at that point the height (i.e., the distance through the body to the surface of the sterna) is $\frac{3}{5}$ of the length of the whole body.

Compared with the European *C. renipustulatus*, Scriba, this insect is more strongly convex, with the shoulders of the elytra much less prominent and the puncturation of the same much stronger.

The only Australian species of *Chilocorus* previously described are *C. Australasiae*, Kerv., and *rubidus*, Hope. Unfortunately, the description of the former (beyond the statement that it is hemispheric and shining) gives no information whatever except regarding the colour and markings; though these are widely different in the present species I should not venture to treat them

definitely as marking anything more than a variety were it not that I perceive from M. de Kerville's admirable figure of his insect that it has the humeral angles of the elytra much more advanced. The latter (omitted from Mr. Masters' "Cat. of the described Col. of Australia") has the elytra almost entirely red and (if M. Mulsant is right in his statement,—apparently founded on personal inspection of the type,—that it is a var. of C. tristis) very differently punctured.

Queensland; a single example was taken by Mr. F. M. Bailey on the Bellenden-Ker ranges.

THE EXAMINATION OF KINOS AS AN AID IN THE DIAGNOSIS OF EUCALYPTS.

PART II.-THE GUMMY GROUP.

By J. H. Maiden, F.L.S., F.C.S.

In Part I. (this Journal, p. 605), I showed that Eucalyptus Kinos entirely soluble in both water and alcohol belong to the Renantheræ, with but one exception. All such Kinos, with certain members of a group yet to be described, satisfy the requirements of the "British Pharmacopæia" in regard to Kino,* and the importation of a single ounce of that drug is unnecessary.

I mentioned in that paper that certain Kinos while readily soluble in water, are very imperfectly soluble in alcohol, owing to the gum they contain. I ventured to call such Kinos the "Gummy" group, which if not elegant is a characteristic designation, as in all other Kinos gum is absent.

Up to the present, I find that the following Eucalyptus Kinos belong to this group:—

- 1. E. siderophloia, Benth.
- 2. E. paniculata, Sm.
- 3. E. crebra, F.v.M.
- 4. E. leucoxylon, F.v.M. (Syn. E. sideroxylon, A. Cunn.)
- 5. E. resinifera, Sm.
- 6. E. robusta, Sm.
- 7. E. saligna, Sm.

^{*} See papers by the author on this subject, Pharm. Journ. [3]. xx. 221, 321.

It is interesting to observe that the first four on the list are "Ironbarks,"—a very natural group. In what relation do the other three species stand to this group and to each other? Following is Bentham's classification of the seven species:—

HETEROSTEMON	YES {	leucoxylon.
	1	paniculata.
Porantheræ		siderophloia.
${\bf Micranther \&} \bigg\{$		side rophloia.
		crebra.
,	$ \left\{ \begin{array}{l} (\textit{Robustæ}) \\ (\textit{Subexsertæ}) \end{array} \right\} $	robusta.
Normales.		saligna.
	(Subexsertæ)	resinifera.

In the above classification the Ironbarks are spread over two, or three, series.

In Mueller's anthereal classification the Ironbarks are spread over two groups, while in the same author's cortical system they naturally come together in Schizophloiæ.* Also, in Bentham's classification, E. resinifera, E. robusta and E. saligna come together under the Normales, and likewise under the Baron's Parallelantheræ, but they are separated in the cortical system, E. saligna falling under Leiophloiæ, and E. robusta and E. resinifera under the Rhytiphloiæ.

It is interesting to find that the undoubted affinities of the Ironbarks extend to their Kinos, and that the affinities of *E. robusta*, *E. resinifera*, and *E. saligna* as regards their anthers (especially strong between the latter two), receive collateral proof in regard to their Kinos. The affinities of *E. robusta* and *E. resinifera* are also referred to in Decade vii of Mueller's *Eucalyptographia*; *E. punctata* Kino contains no gum (falling in the Turbid group); this emphasises the undoubted difference between *E. resinifera* and that species.

Mem.: E. robusta, E. saligna, and E. resinifera all have red timbers, which is an affinity, shared, however, with other species.

^{*}The Schizophloiæ is not, however, a perfect classification. I have seen bark of E. stellulata, for instance, which cannot be distinguished from what are generally known as "Ironbarks."

Much yet remains to be done in regard to the classification of the Eucalypts. We have the anthereal systems of Mueller and Bentham, which have been modified by the former botanist, and the cortical system of Baron Mueller. But unfortunately their usefulness is limited, since they do not sufficiently break down this very large genus. No classification yet suggested is entirely satisfactory, through no fault of their authors. My "Kino system" is an aid in this work of scientific classification, and, as I have worked at all the authentic material I can obtain, I publish it, even in its incomplete state, in order to awaken the interest of botanists in the matter, as the accumulation of the necessary material is beyond the opportunities of one institution or of one individual, even in a life-time. I am sanguine that, by combining the three systems (and perhaps others to be formed), a series of tables to aid in the diagnosis of Eucalypts will in the future be constructed, whose precision will be comparable with that of a chemical table for discriminating the metals.

The great drawback to the classifications hitherto propounded (and I by no means make any extravagant claims for my undeveloped system at this early stage), is that they are not natural, that is to say they sometimes bring into juxtaposition plants which have no strong affinities (as far as we know), and the reverse. Bentham (B.Fl. iii. 186) was alive to the value of a natural system, though he felt that the time had not then arrived for making it. "In the meantime," said he, "as far as I can gather from the information supplied, it appears to me that among large trees, the majority of the Stringybarks are to be found in my first series with reniform anthers, and of the Ironbarks and Box-trees in the following three series." . . I have already fragmentarily alluded to this point.

Characteristic of the Gummy Group.—The one characteristic is the presence of gum, a very simple matter to determine. This



is the group of Kinos to be avoided by the pharmacist, since each member (as far as they have been examined), contains between 30 and 40 per cent of gum. They tend to be perfectly soluble in cold water, and age seems to have comparatively little effect on them in this respect.

The matter of the uselessness of Kinos of this group for the preparation of tinctures is of such importance to every medical man and pharmacist in Australia, that I make no apology for quoting portion of a recent paper by myself in the *Pharm. Journ.* of Great Britain.

"It has been stated that Botany Bay Kino has been procured principally from this species (E. siderophloia). But what are the characteristics of Kino? The official Kino (Pterocarpus Marsupium), is, according to the British Pharmacopæia of 1885, 'almost entirely soluble in rectified spirit.' This is an important property, and on it the Tinct. Kino B.P. is based. Works on Materia Medica, while pointing out certain unimportant points of dissimilarity between the official and Eucalyptus Kino, never state that the latter does not dissolve in rectified spirit, while some make the specific statement that it is soluble in that liquid. my experiments have shown that no Kino is more insoluble in spirti than that of E. siderophloia! . . . The Kino of E. resinifera, Smith, is also comparatively little soluble in spirit, for a similar reason. For this reason alone, I do not hesitate to say that 'Botany Bay Kino' is neither the produce of E. siderophloia, Benth., (E. resinifera, Smith), nor E. resinifera, A. Cunn. Both these Kinos would be quite useless for the preparation of the tincture, and would never be thought of a second time by any person who had made the experiment on either; it is therefore quite certain that these species have not caused pharmacists to use Eucalyptus Kinos more or less for a century, but rather, it has doubtless been the admixture of such Kinos as these with such Eucalyptus Kinos as are freely soluble in spirit, which has helped to bring Eucalyptus Kino into disrepute."

When the Ironbark Kinos are of the same age, I doubt whether they can be distinguished from each other. They darken with age, like other Kinos, colour being with Kinos often simply comparative. They are bright looking, and often with an almost greasy lustre, are obtainable in large pieces, for their tenacity is such (owing to the gum they contain), that they do not easily break into small pieces like the Ruby Kinos,—much less do they break into powder like the members of the Turbid Group. They stick to the teeth if chewed.

Following is a detailed account of such of the "Gummy" Kinos as have fallen into my hands, up to the present. I reserve the publication of an exhaustive analysis of a typical Kino of each of the groups for another occasion.

In the case of *E. siderophloia*, I have described several Kinos of different ages, the object being (as in the Ruby Group), to show the variability in appearance, and the range of variability of composition.

EUCALYPTUS CREBRA, F.v.M., B.Fl. iii. 221.

"Narrow-leaved Ironbark," though, as Dr. Woolls has pointed out, there is a narrow-leaved form of *E. paniculata*, for which this species may be mistaken. Extends from N. S. Wales to Northern Australia.

No. 25. I am indebted to Mr. R. T. Baker for this sample; he obtained it 7th Oct. 1889, at St. Mary's, South Creek, N. S. Wales.

It cannot be distinguished in outward appearance from that of *E. siderophloia* (No. 31) below.

EUCALYPTUS LEUCOXYLON, F.v.M. (Syn. E. sideroxylon, A. Cunn. B.Fl. iii, 209.)

Found in N. S. Wales and Queensland.

Dr. Wiesner (loc. cit.), says of this Kino, "Same reaction as E. globulus.* Large black-red lumps, with fibrous impurities."

^{*}I have not yet been able to obtain Kino of this species, so I am unable to criticise the comparison.

Sometimes the bark of this tree is honeycombed, the cavities being filled with Kino. The blackish Kino, set in rows, in the light reddish-brown bark, has a beaded granular appearance, characteristic, perhaps, of this species.

No. 26. "Ironbark." Received from the Botanic Gardens, Sydney, 29th December, 1887.

This sample is in large masses, from which the firmly adherent wood and bark have to be cut away. It is of horny appearance, and shows something of that texture when cut with a knife. It is opaque-looking, except at fresh fractures. The Kino appears almost black, and it is only at the edges of thin splinters that it is observed to be of a deep garnet colour. It powders with difficulty, forming a powder much like Indian red.

Cold water yields a deep orange-brown solution, leaving a residue consisting of phlobaphene and shavings of bark. The process of solution goes on very slowly. Colour of residue Sienna brown.

EUCALYPTUS PANICULATA, Sm., B.Fl. iii. 211-212.

Found in N. S. Wales, the S. Australian and Victorian species being probably different.

No. 27. "She Ironbark;" North Ryde, 28th April, 1888. Diam. 1 ft. 6 in.; height, 60 ft.

The tree which yielded this particular sample yielded it in unusual abundance. Not only have I never seen a tree of this species yield it in such quantity, but in abundance it rivalled the quantity exuded by an *E. corymbosa* tree in full bearing of Kino. The rugged bark was covered with a mass of long tears, and samples of great purity could readily be obtained. When collected, this Kino resembled orange lac in appearance to a marked degree, though some fragments varied in tint to brown and garnet lac. In all cases the resinous appearance of the Kino is strikingly similar to lac. It is fairly brittle, and forms a bright powder.

It dissolves readily in cold water, forming a very pale-coloured solution of an orange-brown colour. Colour of residue Vandyke brown.

EUCALYPTUS RESINIFERA, Smith, B.Fl. iii. 245.

Found in N. S. Wales and Queensland.

"The specific gravity of this Kino is about 1.416 and the percentage of tannin 65.57 (sic)" (Staiger).

Dr. Joseph Bancroft quotes another analysis by Mr. Staiger of this Kino, in which he found 54 per cent. of Kino-tannic acid, and "also a kind of gum-arabic, but in older samples the amount of Kino-tannic acid is greater, and the gum less." I have no particulars of the above Kinos, so I am unable to say how far Mr. Staiger's analyses and my own are reconcileable.

In the Catalogue of the Museum of the Pharmaceutical Society of Great Britain (p. 46), a Kino called *E. resinifera*, Lin. (a misprint probably for Cunn., and therefore the species would be *E. siderophloia*), is catalogued, and the statement is made that "This gum may be recognized by its reddish tint and powdery surface." Neither of the Kinos of the two *E. resiniferas* answers to this description; such a Kino would probably be allied to *E. rostrata* (a member of the Turbid group).

No. 28. "Mahogany." Received from the Government Botanist of Queensland (Mr. F. M. Bailey), February, 1888.

In smallish tears for the most part, showing firmly adherent wood or bark on one side. A clear-looking Kino of a dark colour, showing a dark ruby colour by transmitted light. It has evidently been collected for a long time. It is inclined to be tough and horny, and is therefore rather difficult to powder. Fracture bright. Colour of powder of a pure burnt Sienna.

Cold water forms a deep orange-brown coloured liquid, which thins out to a bright orange-brown colour. Colour of residue Vandyke brown.

With alcohol (so as to form a tincture of B.P. tinct. Kino strength), the supernatant liquid is of a reddish-brown colour, and the granular residue is of a reddish-brown colour likewise.

EUCALYPTUS ROBUSTA, Smith, B.Fl. iii. 228.

Found in N. S. Wales and Queensland.

Note.—Smith, in describing this species in his Specimen of the Botany of New South Wales, 1793, styled it the "Brown Gumtree" or "New Holland Mahogany." The first name was given because "its resin is an inferior sort of red gum, of a brown hue." Smith's Kino was brownish because it was old, and I draw attention to the name "Brown Gum," which is sometimes quoted in connection with this species, in order to point out that it is never employed in Australia, and was simply Smith's appellation.

No. 29. "Swamp Mahogany." Bolong Swamp, Nowra, August 1888. Diam., 1-5 ft.; height, 60-100 ft. A poor sample. In tears with adherent fibrous bark. The tears are quite bright, and therefore freshly exuded, presumably. It is of a more than ordinarily rich deep ruby colour.

Cold water yields a solution of a medium orange-brown colour, and leaves a reddish-brown residue. With alcohol (tinct. B.P. strength), the liquid is but slightly coloured; the granular gummy residue is rendered opaque-looking, and of tints from flesh colour (gum), to Vandyke brown (phlobaphenes).

EUCALYPTUS SALIGNA, Smith, B.Fl. iii. 245.

Found in N. S. Wales and Queensland.

No. 30. "Blue Gum." Eastwood, near Sydney, 28th April, 1888. Height, 80 ft.; diam., 3 ft.

A dullish-looking Kino, of all tints of garnet. It is of a horny texture for the most part. In bulk it perhaps most generally resembles *E. punctata* Kino in appearance, but it has none of the brown tint of the latter.

It readily dissolves in cold water, forming a quite clear liquid of a dark orange-brown colour, with a small amount of residue of a Vandyke brown colour. Alcohol (B.P. strength of tincture) yields a reddish-brown liquid, and leaves a granular residue of a dark reddish-brown colour.

EUCALYPTUS SIDEROPHLOIA, Benth. (Syn. E. resinifera, A. Cunn., non Smith), B.Fl. iii. 220.

Found in N. S. Wales and Queensland.

"The specific gravity of this Kino is about 1.413, and the percentage of tannic 72.13" (Staiger). I regret that I cannot accept this percentage of tannic acid.

Dr. Joseph Bancroft of Brisbane describes this Kino as exuding plentifully, and at first being in long tears of a pale yellowish colour, which darken into bright red, and eventually into black, becoming more insoluble. (I can endorse this description from examination of New South Wales specimens). He states that a tincture made with $2\frac{1}{2}$ ounces to a pint of proof spirit is valuable as an astringent in diarrhea, but gelatinizes on keeping. I have already pointed out that Kino of this species is little soluble in spirit owing to the gum it contains.

No. 31. "Ironbark." Cambewarra, 12th August, 1886. Height, 80-100 ft.; diam., 4 ft.

Obviously newer than the two succeeding Kinos. It is of a rich ruby colour, both by reflected and transmitted light. It is mostly in tears, rather horny, and therefore difficult to powder. Colour of powder Sienna brown.

It dissolves in cold water almost entirely, forming a medium orange-brown liquid. The residue consists of reddish phlobaphene, with a trace of accidental impurity. Colour of residue umber brown. With alcohol (strength of B.P. tinct. Kino), a pale sherry-coloured liquid is formed. The insoluble residue collects into rounded pieces, swells up slightly, and does not disintegrate with

shaking the bottle. It reminds one irresistibly of potted lobster. When rubbed gently with a glass rod the lumps disintegrate, and the interior of them is found to be of a salmon colour. On evaporation of the spirit the masses shrink in bulk, become of a darker colour (though far lighter than the original Kino), and extremely brittle.

No. 32. "Broad-leaved or Red Ironbark." Richmond, N. S Wales, July, 1886. Given to me by the Rev. Dr. Woolls.

In masses of a pure reddish-brown to ruby, and almost transparent. Woody matter is finely adherent to the outside of the masses. Rather difficult to powder as it feels gummy.

With cold water and alcohol it behaves in exactly the same way and possesses the same appearance as the preceding specimen. Colour of residue umber brown.

No. 33. "Ironbark." Queensland. Received from Mr. F. M. Bailey, Government Botanist of that colony, February 1888.

This sample must have been collected for a considerable period. It is black and dull looking, and quite horny in texture. The ruby colour is apparent if very thin splints be taken. Some wood or bark is firmly adherent. It is exceedingly difficult to powder. Colour of powder dark Sienna brown.

With cold water the solution is much darker than that with the other samples of this species. It is of a deep orange-brown colour. Colour of residue brown to Vandyke brown. Alcohol appears to have but little effect on this Kino.

No. 34. "Ironbark." Cambewarra, 25th September, 1888. Height, 60-80 ft.; diam., 2 ft.

A quite freshly exuded Kino. It is of a pale orange colour, and in tears of considerable size. Fracture dull resinous; gummy to the feel. The description of *E. paniculata* (Ryde), applies to this sample.

Cold water yields a very pale orange-brown solution, with a rose tint. Alcohol (B.P. strength of tincture), yields an almost colourless solution. The gummy granular residue is flesh-coloured.

GUMMY GROUP.

PERCENTAGE OF THE FOLLOWING CONSTITUENTS.

No.	Name.	Kino-tannic Acid.	Insoluble Phlobaphenes.	Gum.	Ash.
25	Eucalyptus crebra, F.v.M.	37.99	trace	40.42	•2
26	E. leucoxylon, F.v.M.	32.51	5:1	34.2	·1
27	E. paniculata, Sm.	34.74	2:9	34.9	•2
28	E. resinifera, Sm.	39.62	2:0	32·1	•1
29	E. robusta, Sm.	35.05	3.7	31.4	•2
30	E. saligna, Sm.	35.26	4.6	31.3	•2
31	E. siderophloia, Benth.	36.07	1.6	33.7	·1
32	Ditto	35.1	1.2	38.1	•1
33	Ditto	33.02	2.2	39.0	•4
34	Ditto	37.08	trace	34.1	·1

STUDIES IN AUSTRALIAN ENTOMOLOGY.

NO. II.—SIX NEW SPECIES OF CARABIDÆ.

BY THOMAS G. SLOANE.

I lately received from Mr. C. French, Government Entomologist of Victoria, six species of Carabidæ belonging to the tribe Carenides; of these four came from the Fowler's Bay district of South Australia, two being new species, which I have named Carenum vicinum, and C. lepidum; the other two are C. rugatum, Blackburn, and C. (Chariscapterus) opulens, Sloane; of the latter there are two specimens, one of which has the elytra of a beautiful coppery purple. The two remaining species are from the McDonnell Ranges, in the centre of the continent, and are a new species of Euryscaphus (E. titanus), and a new Carenum (C. habitans) very distinct from anything I have previously seen.

EURYSCAPHUS TITANUS, n.sp.

Black, shining. Head large, subquadrate $(9\frac{1}{2} \times 12\frac{1}{4})^*$ mm.); thick and heavy, the frontal sulci short, connected behind by a faint curved impression, parallel towards the front, then turning outwards in a broad curve; clypeus sloping backward from the labrum, with the usual setigerous puncture on each side in front of the out-turned frontal sulci; mandibles large, smooth towards the apex, transversely striate on the large internal teeth; eyes prominent, a short blunt tooth-like process projecting forwards and downwards below them; mentum short, lobes rounded externally to the inner point, the inner side almost square, the median tooth broad, triangular, keeled, with broad reflexed margins (epilobes), two deep foveæ on each side of the base

^{*} This is the width without the eyes; the same remark applies to the measurements of the head in the other species described in this paper.

of the median tooth; labrum as usual in the genus. Antennæ as usual in the genus, strong, filiform, last article fusiform Prothorax transversely subcordate (10 x 17 mm.), convex, almost parallel on the sides, broadly lobed behind, the anterior margin sinuate; the marginal border strongly reflexed, crenulate on the edge, flattened and roundly advanced at the anterior angles, very wide and vertical at the posterior angles, behind these thickened and but slightly upturned, more prominent on each side of the basal lobe than along the sinuosities before the lobe; the lobe rounded and margined; along the anterior margin a space of about 12 mm. marked with closely placed longitudinal striolæ; the median line distinctly marked, extending from the rugose part in front to the basal margin; the surface covered with minute scratches, these more apparent towards the sides, thus rendering the lateral parts less shiny than the disc; a lightly marked transverse line across the median line near the base, but the basal part of the prothorax not distinctly defined; two marginal punctures on each side, the basal one being behind the posterior angles. Elytra longer than broad (23 × 20 mm.), very convex, widest at about half the length, rounded on the sides, considerably narrowed to the humeral angles—these well marked and upturned (between them 13½ mm.)—smooth (except for rows of fine punctures visible with a lens*), the base lightly and

^{*} In regard to the rows of shallow punctures often noticed on the elytra in specimens of various species of the Carenides, I now attach no value to this feature for determining species. I have never taken any Carenid which showed these traces of puncturation on the elytra when captured; but observations made with specimens of Carenum arenarium, Sloane, C. scaritioides, Westw., Eutoma loddonense, Castella, and Carenidium lacustre, Macl., have showed me that the result of a lengthened immersion in methylated spirits of wine is to bring out rows of punctures on the elytra of all these species, though naturally they are quite smooth. Specimens of these species which I kept for some months in spirits, on being taken out, all showed rows of shallow punctures on the elytra. Unfortunately, since noticing this I have never had any opportunity of collecting specimens of Carenum to further experiment with. Of course these remarks do not apply to Laccopterum or Epilectus. The same results happen in the genus Promecoderus.

broadly emarginate, with a single oblique row of punctures on each elytron; the lateral margins broad, lightly reflexed on the anterior half, but the upturned edge disappearing towards the apex; a row of fine punctures along the sides, these more closely placed on the anterior half. The anterior tibiæ with two very strong external teeth, above which the exterior ridge has four tooth-like projections visible from above, the inferior ridge is closely serrate extending past the upper external tooth, the apical plate projects in a short tooth below the tarsus; the intermediate tibiæ strong with a short acute tooth projecting outwards at the apex.

Length 49, breadth 20 mm.

Hab.—McDonnell Ranges, Central Australia.

In size this species almost equals E. Waterhousii, Macl., from which it differs in its more elongate elytra, not bulged on the side as in that species, and not nearly so deeply excavate at the base.

A single specimen (Q).

CARENUM (CALLISCAPTERUS) HABITANS, n.sp.

Shining, elytra green, head, disc of prothorax, abdomen, and legs black, the prothorax widely margined with green, the under surface of the prothorax towards the sides, and the inflexed margins of the elytra also green. Head large, subquadrate $(5 \times 7\frac{1}{4} \text{ mm.})$, frontal sulci deep, converging in front, and turning sharply out in a linear form to the outer base of the mandibles, a deeply marked puncture on each side in front of their course behind the lateral teeth of the clypeus; the occiput marked with fine scratches; one supra-orbital puncture on each side. Prothorax very transverse, broader than the elytra* $(6\frac{1}{2} \times 10\frac{1}{2} \text{ mm.})$, rather convex, declivous behind, parallel on the sides, a little narrowed to the anterior angles, these wide, rounded

^{*} The breadth of the prothorax as compared to the elytra varies in some species of *Carenum* (for instance, *Calliscapterus campestre*, Macl.); this difference I believe to be a sexual character.

and produced; the posterior angles rounded off; the base lobate and rounded; the marginal border wide and reflexed, widest at the posterior angles, continuous on the base; the median line light, ending behind in an arched transverse line, between the sinuosities on each side of the base, defining the basal part of the prothorax; a short longitudinal impression extending forward from each side of the basal lobe; the posterior declivous part of the prothorax transversely striolate; two marginal punctures on each side. Elytra oval (14 × 10 mm.), convex, marked with seven rows of distinct shallow punctures * and two discoidal punctures towards the apex, lightly rounded on the sides, and equally rounded in front and behind; the humeral angles prominent and upturned, the base emarginate between them, steeply declivous to the peduncle and marked with a double row of umbilicate punctures on each elytron, a row of evenly placed umbilicate punctures along the margins, every alternate one being larger; the lateral margins broad, especially towards the apex. Prosternum lightly excavate between the coxe. The legs strong, the intermediate and posterior tibiæ thick and ciliate as in C. odewahni, only heavier; the anterior tibiæ tridentate externally, the exterior ridge with four projections above the large teeth, the inferior ridge strongly serrate to the apex of the tibiæ, the apical plate with a short tooth at the apex.

Length 29, breadth 10½ mm.

Hab. - McDonnell Ranges, Central Australia.

A very distinct species; its affinity is to Carenum (Calliscapterus) odewahni, Casteln., but it differs inter alia in its elytra not being narrowed to the base, and in having only two, instead of three, prothoracic marginal punctures.

CARENUM LEPIDUM, n.sp.

Smooth, shining; elytra iridescent with the disc a deep blackish-purple changing to blue or green on the sides, the

^{*} See note at page 1289.

lateral margins (and inflexed underpart of elytra) of a bright copper colour, prothorax having the disc deep black with wide fiery copper margins, head and underparts shining black. Head subquadrate $(2\frac{1}{2} \times 2\frac{3}{4} \text{ mm.})$; the frontal sulci almost parallel, a little wider behind; the lateral teeth of the clypeus very prominent, a deeply impressed puncture behind them on each side; the preocular processes prominent; the eyes hardly projecting beyond the sides of the head; one supra-orbital puncture above each eye. Prothorax transverse $(3\frac{1}{8} \times 5 \text{ mm.})$, rather convex, truncate in front between the anterior angles—these a little advanced—, very lightly rounded on the sides, broadest just before the posterior angles; the marginal border wide, reflexed, widest at the posterior angles, sinuate on each side between the posterior angles and the base; the base shortly lobate, very lightly emarginate; the median line finely impressed, not reaching the border behind; the basal part of the prothorax not crossed or defined by a transverse line; two marginal punctures on each side. Elytra lævigate, elongate, very little wider than the prothorax $(9 \times 5\frac{1}{2} \text{ mm.})$, convex, with two discoidal punctures towards the apex; the sides subparallel, widest at about half the length, a little narrowed to the base, the base truncate, the humeral angles strongly marked and upturned; the lateral margins not wide, within them a row of closely set punctures. Prosternum hardly impressed between the coxe, and obliquely narrowed behind. Anterior tibiæ tridentate; the exterior ridge with two projections above the large teeth, inferior ridge consisting of five short projections, the apical plate toothed at the apex; intermediate tibiæ strongly serrate, and with an acute spine at the apex externally.

Length 16, breadth $5\frac{1}{2}$ mm.

Hab.—Fowler's Bay district.

A very distinct species; its affinity is evidently to *Carenum* (*Chariscapterus*) opulens, Sloane, but it is very different in its parallel and elongate form. The "inferior ridge" of the anterior tibie with strong tooth-like projections, is of a different form to

what I have seen in any Carenid before. Two specimens; one shows a single strong puncture on the declivous part of the base of each elytron, the other has no punctures on the base.

CARENUM VICINUM, n.sp.

Elytra of a dark blue, almost black in the middle, but becoming a fine purple towards the sides, the margins cæruleous, the prothorax black with a violet margin, head, legs, and underparts of prothorax and abdomen black. Head subquadrate $(4\frac{1}{2} \times 5\frac{3}{4} \text{ mm.})$, frontal sulci almost parallel, a little sinuate, diverging in front as usual, an obsolete transverse impression behind them; the preocular processes prominent; the eyes not prominent, one supraorbital puncture above each eye. Prothorax transverse $(5\frac{1}{4} \times 8)$ mm.), rather convex, broadest at the posterior angles, rounded and a little narrowed to the anterior angles, these very slightly produced; the posterior angles rounded off; the margin sharply sinuate on each side of the base, thus giving it a shortly lobate appearance; the lobe very gently rounded and emarginate in the middle; the marginal border wide, sinuate behind, and widened to form a conspicuous angle on each side of the basal lobe; the median line lightly impressed, its course crossed by very fine transverse striolæ; the basal part of the prothorax not defined by a transverse line; only two marginal punctures discernible on each side, one near the anterior angle, the other at the posterior angle. Elytra lævigate, ovate, a very little broader than the prothorax $(11\frac{1}{2} \times 8\frac{1}{4} \text{ mm.})$, gently rounded on the sides, very slightly narrowed to the base; the humeral angles well marked and upturned, the base truncate and steeply declivous between them; the marginal border narrow and reflexed, a row of fine punctures within it; on each elytron a large discoidal puncture towards the apex, and a few punctures in a single row on the base. Anterior tibie bidentate externally, the exterior ridge with four projections above the large teeth, inferior ridge serrate, reaching the apex of the tibiæ, the apical plate with a sharp projecting spur at the apex.

Length 24, breadth $8\frac{1}{4}$ mm.

Hab.—Fowler's Bay district.

A single specimen. This species is very closely allied to *C. planipenne*, Macl., but differs in its colour showing no trace of green; in the shape of the elytra, which are not so flat, and also differ in not being emarginate and gently declivous between the shoulders, and in being much narrower and more sharply rounded behind. The shape of the prothorax is the same in both species, though a little more convex in *C. vicinum*; I can find no trace of more than two marginal punctures on each side, while in *C. planipenne* there are three; *C. vicinum* has only one supraorbital puncture on each side of the head while *C. planipenne* has two.

Notonomus arthuri, n.sp.

Q. Elytra of a metallic green or purple, head, prothorax, and underparts black. Head smooth, with the frontal impressions well marked; a light transverse impression on each side behind the posterior supra-orbital puncture; the eyes prominent, inclosed behind. Prothorax a little broader than long $(4\frac{3}{4} \times 5\frac{1}{2} \text{ mm.})$ —in one specimen the measurements almost equal-slightly rounded on the sides and a little narrowed to the base; the posterior angles rounded; the base widely and very slightly emarginate between the lateral impressions, these narrow and reaching the basal margin; the marginal border reaching behind the lateral impressions on each side of the base; the posterior marginal punctures placed before the angles of the base, and inside the marginal border; the median line distinct, not reaching either margin. Elytra oval (12 × 7 mm.), not convex, a little narrower to the base, rounded on the sides, broadest at about half the length, sinuate behind, dehiscent at the apex, striate; the interstices flat (9th stria and interstice as usual), 3rd with three impressed punctures; the border of the base almost straight; the humeral angles not marked. The segments of the abdomen smooth as The prosternum not excavate between the coxæ.

Length 20, breadth 7 mm.

Hab.-Mt. Wilson, Blue Mountains, N.S.W.

This species comes near N. variicollis, Chaud., but has the basal angles of the prothorax more rounded. Three specimens, all Q, taken by Mr. A. Sidney Olliff (to whom I have dedicated it) at Mt. Wilson. The type is in the Australian Museum.

Notonomus lateralis, n.sp.

3. Black, shining. Head smooth, rather broad; clypeus with a setigerous puncture on each side, the clypeal suture distinct, ending on each side in the frontal impressions, these lightly marked and linear; eyes not prominent, inclosed behind; the vertex hardly at all transversely impressed behind the posterior supra-orbital puncture. Prothorax subquadrate, slightly broader than long $(4\frac{1}{4} \times 5 \text{ mm.})$, lightly rounded on the sides, hardly at all narrowed to the base, the posterior angles rounded off; the base widely emarginate between the lateral impressions, these short and not reaching the basal margin; the marginal border reflexed on the sides, reaching as far as the inner side of the lateral impressions on each side of the base; the posterior marginal punctures in the lateral border at the basal angles. Elytra parallel (10 × 6 mm.), truncate at the base, rather flat on the disc, the sides and apex declivous, broadly rounded and hardly at all sinuate behind, dehiscent at the apex, strongly striate, the 9th stria very wide and hardly bifurcate behind, the abbreviated stria short and oblique; the interstices convex towards the apex, 2nd, 4th, and 6th narrowed behind, 9th marked throughout its course by umbilicate punctures, these closer (but not confluent) towards the apex, 3rd of each elytron with three punctures (all on the posterior half), of these two deeply impressed on the declivous part near the apex, the other four forming a square just behind the middle of the elytra; the lateral margin wide, the border being more decided behind; the border of the base is arched, not toothed though slightly raised at the humeral angles. The three last segments of the abdomen

with a deep transverse impression on each side. The posterior tarsi with the articles shorter and thicker than usual in the genus.

Q.—Having the elytra completely flattened on the hinder part of the disc, and almost vertical on the sides and apex; the wide smooth space within the marginal border (representing the 9th stria) wider than in the 3.

Length & 17½, breadth 6 mm.

Hab.—Mt. Wilson, Blue Mountains, N.S.W.

A very distinct species differing from all other species of *Notonomus* I have seen in having distinct and deep lateral impressions on the segments of the abdomen, and in the wide smooth space within the marginal border of the elytra; also in the flattened elytra with vertical sides and apex in the Q.

Three specimens taken by Mr. A. Sidney Olliff.

NOTES ON THE NIDIFICATION OF MERULA VINI-TINCTA, GLD., AND OCYDROMUS SYLVESTRIS, Scl.* By A. J. North, F.L.S.

NOTES ON THE BREEDING OF STERNULA SINEN-SIS, GMEL., IN AUSTRALIA.* By A. J. North, F.L S.

DESCRIPTION OF A NEW AUSTRALIAN SKINK.*
By E. P. Ramsay, L.L.D., F.R.S.E., and J. Douglas
Ogilby, F.L.S.

DESCRIPTIONS OF TWO NEW SKINKS.*
By J. Douglas Ogilby, F.L.S.

^{*} Note.—The four papers read under the above titles have already been published in the Records of the Australian Museum, Vol. I. No. 1 (March, 1890).

NOTES AND EXHIBITS.

Mr. Maiden exhibited samples of the kinos referred to in his paper.

Mr. Ogilby exhibited the three lizards described above.

Mr. North sent for exhibition the nest and eggs of *Merula vinitincta*, the eggs of *Ocydromus sylvestris*, and skins and eggs of *Sternula sinensis*.

Mr. Sloane exhibited the insects described in his paper.

Mr. Rohu exhibited the upper jaw of a Death Adder (Acanthophis antarctica) in which on one side there is an equally developed supplementary tooth placed on the transverse plane.

Mr. A. Sidney Olliff sent for exhibition three specimens (two and one Q) of Atyphella lychnus, Oll., together with the following note on the discovery of the female of that species:—

"In answer to an appeal for information about the sexes of the Fire-fly recently described in the Proceedings of this Society (see antea p. 645), under the name Atyphella lychnus, Mr. James D. Cox has forwarded to me 3 and 2 examples which he found in copula at Mount Wilson early in the present month. An examination of these specimens enables me to state that Atyphella belongs to the division of the family Lampyridæ in which both sexes are winged, and that it is allied to Lucidota and Photinus of the tribe Lucidotina, a fact which I hardly anticipated from the general form and structure of the male insect. The female has the head and eyes much smaller than the male, and is altogether broader in form, and the underside does not present

distinct light-organs, the entire body—in the single specimen before me—being yellowish-white. In communicating to me his discovery of the female Atyphella, Mr. Cox remarks that he did not observe the specimen to be luminous, an observation of the greatest interest and importance, as it goes to support the idea that the females rarely fly in company with the males, but remain concealed in the grass or herbage like the European Luciola already alluded to. At all events the absence of luminosity in the female Atyphella would account for its having escaped the notice of the collector."

ANNUAL GENERAL MEETING

29TH JANUARY, 1890.

PRESIDENT'S ADDRESS.

At the close of 1889, the fifteenth year of our Society's existence, I have once more the honour of laying before you the annual report upon the progress and state of the Society, its gains and losses, and the work which it has achieved. In connection with the latter topic, I shall, as heretofore, make reference to such other contributions to the Natural History of Australia as I have been able to observe during the past year.

The first Monthly Meeting of the Society was held on 25th January, 1875, under the presidency of Mr. (now Sir William) Macleay,—who also, at the first Annual General Meeting, 31st January, 1876, delivered the first President's Address. In the meanwhile the "Chevert" expedition had been organised and equipped, and had completed its explorations in and about New Guinea. I have on a previous occasion made the remark that it was unquestionably to that expedition and its results that this Society owes its early and vigorous growth. Nevertheless the remark will bear repeating, as well as the reminder that the whole cost of that expedition was borne by our then President, a point which should not be forgotten in the enumeration of his services to Natural History, and his extraordinary contributions towards the welfare of the Linnean Society of New South Wales.

The number of original members was 125, many of whom there is reason to suppose subscribed not altogether on account of particular interest in any branch of Natural History, but rather in order to give a kindly help to an infant Society, whose objects everyone approved.

At any rate, there remain now, out of these 125, only 24 actual members of the Society, and it seems not unsuitable to our present time of assembling to record the names of the veterans:—

BRADLEY, H. H. BURTON.

Brazier, J., F.L.S.

Cox, J. C., M.D., F.L.S., President Fisheries Commission.

Dodds, Hon. A., M.L.C.

ELDRED, W. H., Consul for Chili.

HAY, Hon. Sir J., K.C.M.G., &c., President, Legislative Council.

JENNINGS, Hon. Sir P. A., K.C.M.G., &c., M.L.C.

KING, Hon. P. G., M.L.C.

LIVERSIDGE, A., M.A., F.R.S., Professor of Chemistry, Sydney University.

LARK, F. B.

MACLAURIN, H. N., M.D., &c., Medical Adviser to the Government.

MACLEAY, The Hon. Sir WILLIAM, Kt., M.L.C.

MASTERS, G., Curator, Macleay Museum, Sydney University.

MACINTOSH, J. N.

MEREWETHER, E. C.

Makinson, H. M.

NORTON, Hon. J., M.L.C.

OSBORNE, G.

RAMSAY, E. P., LL.D., Curator, Australian Museum.

READ, R. B., M.R.C.S.

Stephens, W. J., M.A., F.G S., Professor of Natural History, Sydney University.

WARD, W. D., M.A., M.D.

WILKINSON, C. S., F.G.S., Government Geologist.

WALKER, R. C., Principal Librarian, Free Public Library.

At the present moment the Society numbers one hundred and seventy-one members, five having withdrawn, by resignation or otherwise, and three new members having been elected since the last annual meeting.

But the Society has suffered a very severe loss in the death of one of its most distinguished members, eminent for his attainments, admirable for his union of patience and energy, and everywhere beloved for the unaffected simplicity, courtesy, and kindness which so remarkably characterised his intercourse with others. The Rev. Julian Edmund Tenison-Woods, who deceased in Sydney on Monday, the seventh of last October, became first attached to this Society upon his election by the Council to the status of a Corresponding Member, in June, 1876. He subsequently became, November, 1878, an ordinary member, and was elected President at the next annual meeting. After holding this office for the customary period of two years, he was elected Vice-President at the commencement of 1883, in which office he continued until the time of his death.

In the list of contributors to the First Series of our Proceedings (published by the Society, 1887), no less than seventy entries testify to the exuberant industry, no less than to the extraordinary variety of attainments, which characterised our lamented friend. They relate to so many different branches of Natural History that it would be impossible to classify them within the limits which the nature of my present duty prescribes.

I therefore simply enumerate them in the order of their appearance, as follows:—

P.L.S.N.S.W., 1st Series, Vol. I.: Observations on the genus Risella. Vol. II.: On some Australian sp. of Trochocochlea; On a new sp. of Newra; On a variety of Trigonia Lamarckii; On a Tertiary Formation at New Guinea; The Echini of Australia, including those of the "Chevert" Expedition, (pp. 31); On some Australian Shells described by Dr. A. Gould; Description of some new Marine Shells (Port Jackson Heads); On some

Tertiary Fossils from New Guinea; On the Extra-tropical Corals of Australia; On the Echini of Australia, supplemental note. Vol. III.: On an Australian variety of Neritina pulligera, Linn.; On Arachnopora, new genus of Milleporidæ; On Psammoseris, new species; On Desmophyllum, new species, and young of Cycloseris Sinensis; On some Australian Littorinidæ; On Bulimus Dufresnii; On three new genera (Vasillum, Diechoræa, Phyllopora) and one new species of Madreporaria; On two new species Land Shells; On Euctimenaria, new genus of Cheilostomatous Polyzoa; On some Corals from Darnley Island; On some new extra-tropical Corals; On some Freshwater Shells from New Zealand; On some Tertiary Fossils from Muddy Creek, Victoria. Vol. IV.: Continuation of last paper; On some new Marine Shells; On some Freshwater Shells from New Guinea; On some new Marine Shells from Moreton Bay; On Arauja albens; On the relations of the Brisbane Flora; On some new Australian Echini; On Heteropsammia Michelinii, E. and H.; On Distichopora, new species; On Euctimenaria ducalis; On some Fossils from Levuka, Viti; On some Post-tertiary Fossils from New Caledonia. Vol. V.: On some of the littoral Marine Fauna of North-east Australia; On a Fossiliferous Bed at the mouth of the Endeavour River; On the habits of some Australian Echini; Résumé of a report on the Fossil Radiata of New Zealand; On Flabellum, new species; On Diaseris, new species; On a young Temnopleurus. Vol. VII.: Botanical notes on Queensland, No. 1; On Stomopneustes, new species, and a new variety of Hipponoe variegata; On various deposits of Fossil Plants in Queensland; Botanical notes on Queensland, No. 2; On Allopora, new species; Botanical notes on Queensland, No. 3; Botanical notes on Queensland, No. 4; On a Coal Plant from Queensland; Physical Structure and Geology of Australia, (pp. 18); On a Mesozoic Mytilus from the Barcoo; Botanical notes on Queensland, No. 5; On a specimen of Coral from Port Jackson; On Brachyphyllum, species from Mesozoic coal beds, Ipswich, Queensland. Vol. VIII.: On the Fossil Flora of the coal deposits of Australia, (pp. 130); On some Mesozoic Fossils from

Central Australia. Vol. IX.: Letter to Hon. W. Macleay, giving an account of travels in Perak; Report on the Geology and Physical Geography of the State of Perak, (pp. 28). 2nd Series, Vol. II.: A Statistical, Geographical, and Botanical Account of the Volcano of Taal, in the Island of Luzon, (pp. 125). Vol. III.: Fisheries of the Oriental Region, (pp. 90); Geographical Notes in Malaysia and Asia, (pp. 93); Malaysian Land and Freshwater Mollusca, (pp. 97). Vol. IV.: Essay on the Vegetation of Malaysia, (pp. 97). Also, in co-operation with Mr. F. M. Bailey—Vol. IV.: A Census of the Flora of Brisbane. Vol. V.: On some of the Fungi of N.S.W. and Queensland. Also, the Presidential Addresses for the years 1880 and 1881.

In the Proceedings of the Royal Society of Tasmania the following papers appear: (1874) Notes on the Physical and Zoological relations between Australia and Tasmania; (1875) On some new species of Tasmanian Marine Shells; On some Tertiary Fossils from Table Cape; On the genus Fenestella; On the Freshwater Shells of Tasmania; Description of new Tasmanian Shells; (1876) History of Australian Tertiary Geology; On some Tasmanian Patellidæ; On a new genus of Nudibranchiata; On some new Tasmanian Marine Shells; On Ampullaria, n.sp.; Fossil Echinodermata; Notes on Ditto; (1877) Census with brief descriptions of the Marine Shells of Tasmania and the adjacent Islands; On Tasmanian Siphonaria, including a new species; On some new Tasmanian Marine Shells; (1878) On some new Tasmanian Marine Shells; On some Tasmanian Freshwater Univalves; (1879) On some Tasmanian Trochidæ; Notes on Bythinella, &c.; (1880) On some introduced Plants of Australia and Tasmania,

In the Proceedings of the Royal Society of New South Wales we find:—Vol. X.: On some Tertiary Australian Polyzoa; Vol. XI.: On the Tertiary deposits of Australia; On some new Australian Polyzoa; The Palæontological evidences of Australian Tertiary formations; On some Australian Tertiary Corals; Vol. XII; Tasmanian Forests, their Botany and Economic Value; The Molluscan Fauna of Tasmania; On some Australian Tertiary

83

Fossil Corals and Polyzoa; Vol. XVI.: The Hawkesbury Sandstone; On some Carboniferous Marine Fossils; On some Mesozoic Fossils from the Palmer River, Queensland; A fossil plant formation of Central Queensland; Vol. XVII.: On the Waianamatta Shale; Vol. XXII.: On the Desert Sandstone; and, finally, On the Anatomy and Life History of Mollusca peculiar to Australia. This last paper obtained the Society's Medal and Prize offered for the best original work on the subject proposed. To Mr. Woods was also awarded the Clarke Medal of the same Society for the year 1888.

Transactions of the Philosophical Institute of Victoria.—Vol. II.: Observations on Metamorphic Rocks in S. Australia: Vol. III.: Remarks on a Tertiary Deposit in S. Australia; Vol. IV: On some Tertiary Deposits at Portland Bay, Victoria.

Royal Society of Victoria.—Vol. VI.: On some Tertiary Fossils in S. Australia; Vol. VIII.: On the Glacial Period in Victoria; Vol. XIV. (1879): On some new Marine Mollusca; Vol. XVI.: On the genus Amathia of Lamouroux, with descriptions of new species; List of Authors who have written directly or indirectly on Polyzoa; Vol. XVII.: The Hodgkinson Gold Fields, Northern Queensland; On some new Marine Mollusca.

Transactions of the Philosophical Institute of Adelaide.—(1865) The Tertiary Rocks of S. Australia.—Part 1. Introduction; Part 2. The Mount Gambier Fossils; Part 3. Brachiopoda; (1866) The same continued.—Part 4. Fossil Echinidæ; The Geology of the South-East; (1878) On some Fossil Corals from Aldinga; (1879) A List of Australian Star Fishes.

Royal Society of S. Australia.—(1880) On some fossil and recent species of Australian Seleniaridæ; On some New Corals from Australian Tertiaries.

Proceedings of the Queensland Philosophical Society.—Vol. III. (1881): Geology of Northern Queensland.

Palæontology of New Zealand.—Part IV.: Corals and Bryozoa of the Neozoic Period in New Zealand, 1880.

Journal of the Straits Branch of the Royal Asiatic Society.— No. 13. On the Stream Tin Deposits of Perak; No. 14. A journey to the Summit of Gunong Bubu.

Nature.—Vol. 31: Physical Geography of the Malayan Peninsula.—The Borneo Coal Fields; Vol. 33: The Geology of Malaysia, S. China, &c.

REPORTS, PAMPHLETS, &c.

North Australia; its Physical Geography and Natural History, pp. 46. Adelaide, 1864. Geology of Portland; Two Lectures, Portland, Victoria, 1865. Report on the Geology and Mineralogy of the S.E. district of S. Australia. Adelaide, 1866. Report on the Wilde River and Great Western Tin Mine. Brisbane, 1881. Lectures on the Burrum Coal Field, Queensland, with map. Maryborough. 1881. On the Natural History of N.S.W. Sydney, 1882. Coal Resources of Queensland. Brisbane, 1883. Report on the Geology and Mineralogy of the Northern Territory. Adelaide, 1887.

LETTERS TO NEWSPAPERS.

The Australasian.—(1866) Physical Geography of Australia, 6 letters; (1867) A trip to Wood's Point, 4 letters; (1879) A trip to a Coral Reef; (1880) A few words about Lichens; Australian Coral Reefs, 6 letters.

The Sydney Mail.—(1879) Wonders of Nature in Australia, 10 letters; (1880) Notes made in N. Australia, 12 letters; (1882) A visit to the Wilde River, 12 letters; (1883) Coal Plants of Australia, 12 letters.

South Australian Advertiser.—(1879-80) Northern Queensland, 12 letters.

Sydney Morning Herald.—(1880) Nature in the Far North, 18 letters; (1882) A day with the Myalls, 2 letters; (1884) Earthquake in Straits of Sunda, 3 letters; A journey through Java, 20 letters; An exploration in Perak, 7 letters; (1887) Explorations in N. Australia, 8 letters; A trip to the Victoria River, 2 letters; Notes of Travel, 7 letters; The Coal Trade between Australia and the East, 6 letters.

Bundaberg and Mount Perry Mail.--No. 477, 1881: The Carboniferous Rocks of the Lower Burnett.

Besides these contributions to the current literature of Natural History, I may mention the following important works:—Geological Observations in South Australia. 1 vol., London and Melbourne, 1862; History of the Discovery and Exploration of Australia. 2 vols., London, 1865; Fish and Fisheries of New South Wales. 1 vol., Sydney, 1882.

The following sketch of Mr. Woods's life and works is taken from a biographical notice which appeared in the *Adelaide Advertiser* of Oct. 8, 1889, and which is attributed to the pen of a very near relative who writes with special authority.

"The Rev. Mr. Woods was the son of Mr. James Dominick Woods, of the Middle Temple and of Sydenham, Kent, who held a leading position on the literary staff of the Times for 40 years. His mother was HENRIETTA MARIA ST. ELOY, the daughter of the Rev. Joseph Tenison, of Donoughmore Glebe, in the County of Wicklow, Ireland. His maternal grandfather was the Bishop of Ossory, who was the nephew of the Most Rev. Thomas Tenison, Archbishop of Canterbury. Mr. Woods was born at West Square, London, on November 15, 1832." When his school education was completed he became associated with the Rev. CANON OAKLEY of Islington, whom he assisted in establishing the Catholic Schools of that suburb. After a temporary attachment to the Order of Passionists, he proceeded to France, when he became one of the Professors at the College for Naval Cadets at Toulon. Here his taste for geology and natural science received its first development.

Returning to England in about four years, he made the acquaintof Dr. Willson, Roman Catholic Bishop of Tasmania, with whom in 1855 he went to that colony to establish a system of schools for the education of Roman Catholic children.

From Tasmania he removed to South Australia, where he was ordained in 1857, and where he remained for some years, engaged both in mission work, and in the organisation of the Roman

Catholic Schools of that colony. He afterwards became a missionary priest in New South Wales, with Sydney as his head quarters. In 1883, on the invitation of Sir F. A. Weld, K.C.M.G., Governor of the Straits Settlements, he proceeded to Singapore in order to explore Malacca and furnish the Government with some reliable information as to its geology and mineral resources. On his way thither he stayed for a time in Java, and was witness to one part of the eruptive outbreak at Krakatoa. He ascended two of the volcanoes while they were in eruption, and his experiences, as detailed in a private letter, were such as to determine him not to try the experiment again. His description of the scenes he encountered whilst passing through the Straits of Sunda was shocking. The sea was literally covered with corpses. However, it did not discourage him from adventures in other parts of the East, not less hazardous than the ascent of active volcanoes. Mr. Woods traversed the island of Java from end to end, and performed the same arduous task through Siam and Malacca, in each of which places he enriched the scientific literature of the world with his observations on the geology and botany of the regions he passed through. Sir Frederick Weld, shortly after Mr. Wood's arrival in Singapore, left the colony on leave, but before his departure he furnished Mr. Woods with credentials to the native princes, who assisted him in every way they could. Before he left Singapore the Colonial Secretary of that colony advised the British Government of the arrival of the Rev. Mr. Woods, and urged the desirableness of engaging his services to report to the Admiralty upon the coal resources of the eastern seas. The Admiralty accordingly detached from the naval squadron in the China Seas the Corvette "H.M. Pegasus," Captain Bickford, to enable Mr. Woods to make the necessary investigations. He thus visited and explored many parts of Borneo, Siam, Malacca, the Philippine Islands and other places. His reports to the Admiralty have not been made public, but their value was recognized in the munificent way in which Mr. Woods was rewarded for his investigations and descriptions. In a private letter from one of the principal naval officers on the

Chinese Station the remark was made that Mr. Woods' discoveries as to the coal resources of the East had increased the strength of the British Navy in that part of the world by a force better than half-a-dozen good-sized frigates. After a lengthened cruise Mr. Woods arrived at Hong Kong, where he was most cordially welcomed and entertained by Sir G. Bowen and the Admiral of the station. Then he went to ascend the Hoang Ho, but was compelled by the state of his health to return. He came back to Australia in "H.M.S. Flying Fish," which landed him at Port Darwin. Here Mr. J. L. Parsons, the Government Resident on the Northern Territory, engaged his services to visit and report upon the mineral districts of that portion of the country. After a short visit to Queensland he returned to Sydney after an absence of about four years.

Now, however, the continued hardships which he had undergone began to tell upon him, and his health slowly but surely gave way. "For nearly two years he was confined to his house, and latterly he was so debilitated that he was unable to see any but his immediate attendants. He suffered greatly, but he bore his afflictions with remarkable fortitude, and he accepted his fate with resignation. His departure from life was soothed by all the ministrations of that religion to which he had devoted his life, and he left the world in which his career had not been barren of results with no regrets such as might disturb a mind less evenly balanced and of religious convictions less assured than his own."

He had here many kind and considerate friends (among whom you will readily understand that Sir William Macleay held a prominent place), but he had been exposed to troubles of which he made no complaint, but which seemed to have made a lasting impression on his naturally sanguine and happy temperament. On this head I quote a few sentences selected from a brief but affectionate memoir of the departed, which appeared in the Centennial Magazine, Sydney, January 1, and was written by his friend and our fellow member, the Rev. J. Milne Curran, now of Bathurst:—"Of his personal character the public knew little.

He was a most genial companion and a sympathetic friend. There was a certain vein of sadness in his manner. The deep lines of care that furrowed and seamed his face were noticeable to many who knew nothing of his inner life. Even though in latter years tedious work was for him a stern necessity, he never lost that genial affability that charmed his friends. A glance through his correspondence shows that he had to bear trials that well-nigh embittered many years of his life. His sensitive nature never rallied from the hardships that induced him to leave Adelaide. He was forced to learn, too, that after doing his all, in giving the best years of his life to the service of Religion, he had to face actual need, or appeal to the charity of his friends. While his name was spoken of with honour and his work pointed to with pride by his co-religionists, he was himself on the very verge of want." Again, "shortly before his death he was given to understand that he should comply with an exceptionally exacting Church regulation-'It is very hard, very hard,' I heard him say, 'but I hope to practise a little of what I have been teaching." -- Requiescit in pace.

I have drawn up a list of the Learned Societies, Institutions, Government Departments and Journals with which this Society is in correspondence, and to all of which our Proceedings are regularly forwarded.

The consequent Exchanges and Donations which we have received during the year are entered in each case. But for the sake of simplicity the words *Volume*, *Tome*, *Band* and the like are omitted before the Roman numerals, and the words *Part*, *Number*, *Heft*, *Fasciculus*, &c., are in like manner left out before the Arabic numerals.

AUSTRALIA.

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Mem. 2nd.—Rept. Lord Howe Island. Trustees' Rept. (1888). Lendenfeld, Monograph on Horny Sponges. Sydney-Australian Museum.

Ramsay, Birds of N.S.W.

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" Free Public Library.

Reports (1888) (1889).

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" Department of Mines.

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[Note.—The Government of N.S.W. also purchase, at the rate of £1 per vol., 100 copies per annum of the Proceedings for public distribution.]

Melbourne-Field Naturalists' Club of Victoria.

Vict. Naturalist V. 9, to VI. 5, and 9th Ann. Rept. F.N.C. V.

" University Library.

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" Zoological and Acclimatization Society of Victoria.

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Townsville-Geological Survey.

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Leeds—Conchological Society of Great Britain and Ireland. Journ. V. 12 to VI. 3 (1889).

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" Zoological Society.

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SCOTLAND.

Edinburgh—Royal Society.

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TRELAND.

Dublin-University Museum.

" Royal Dublin Society.

Trans. Ser. 2, I. 1-25, II. 3 pts. III. 1-10, IV. 2-5; Proc. I. 3 pts. II. 7 pts. III. 7 pts. IV. 9 pts. V. 1-2, VI. 1-6 (1889).

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Calcutta—Asiatic Society of Bengal.

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Cherbourg—Société Nationale des Sciences exactes et naturelles et Mathématiques de Cherbourg.

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Antwerp—Société Royale de Géographie d'Anvers.

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Tidskr. I.-III. VI. IX. X. 1 (1889).

Upsal-Société Royale des Sciences.

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Bull. (1888), Nos. 3, 4; (1889), No. 1.

St. Petersburg—Académie Impériale des Sciences.

Mém. Ser. 7, XXXVI. 1-11 (1888).

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Mém. III. 4, VIII. 1.

Bull. VII. 6-10, VIII. 1-5; Suppl. (1889).

La Société Entomologique de Russie.

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Odessa-Société des Naturalistes de la Nouvelle-Russie.

Zapiski, XIII. 2, to XIV. 1 (1889).

Z. Math. IX. (1889).

Kieff-La Société des Naturalistes.

Helsingfors-Société des Sciences de Finlande.

Acta XV.; Bidrag t. Kännedom Fin. Natur o. Folk. 45-47.

Finska Vetenskaps Soc. XXVIII.-XXIX. etc.

Societas pro Flora et Fauna Fennica.

Acta III.-IV. (1888), Meddelanden af S. 140, (1888).

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Batavia—Kongl. Natuurk. Vereeniging in Nederl.-Indië. Tijdschrift, XLVIII. (1888).

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Tokyô—College of Science, Imperial University. Journ. II. 4.5, III. 1-2 (1889). The Library of the Society has been further enlarged by many donations, amounting in all to over 900 volumes. Of these over 700 have been presented by Sir William Macleay and include many serial and other works of great value. They are as follows:—

"Philosophical Transactions of the Royal Society of London." 65 vols. (1801-58 and 1881-87); "Transactions of the Royal Society of Edinburgh." 21 vols., with 6 Parts and 2 Appendices (1788-1881); "The Edinburgh Philosophical Journal." 90 vols. (1819-1864); "Nature." 13 vols. (1876-1882); "Zeitschrift für wissenschaftliche Zoologie." Bd. I.-XXXIX.; XLVI. Hefts 3 and 4; XLVII. Hefts 1 and 2 (1849-1888); "The Botanical Cabinet." By C. Loddiges and Sons. 21 vols. (1818-1833); "The Journal of Botany." 17 vols. (1863-1879); "Annales de la Société Entomologique de Belgique." Tomes I.-XXV. (1857-1882); "Tijdschrift voor Entomologie." Vols. I.-XXI. (1858-1878); "Entomologische Zeitung, herausgegeben von dem Entomologischen Vereine zu Stettin." Jahrg. I.-XLVIII. (1840-1887); Mittheilungen aus der Zoologischen Station zu Neapel." Bd. I.-III. (1878-1882); "Archives de Biologie." Tome VIII. (1888); "Notes from the Leyden Museum." Vol. X., Parts 1-3 (1888); "Novæ Hollandiæ Plantarum Specimen." Auctore J. J. Labillardière. 2 vols.; "Roberti Brownii Prodromus Florae Novæ Hollandiæ et Insulæ Van-Diemen;" "Ichtyologie, ou Histoire Naturelle des Poissons." Par M. E. Bloch. 6 vols. (1785-1788); "Fragmenta Phytographiæ Australiae, Contulit Ferdinandus Mueller." Vols. I.-V. (1858-1866); "The Natural History of the Tineina." By H. T. Stainton, assisted by Prof. Zeller and J. W. Douglas. 13 vols. (1855-1873); "Reports of Explorations and Surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean, 1853-4." 12 vols. (1855-1860); "Proceedings of the Academy of Natural Sciences of Philadelphia." 28 vols. (1841-1876); "Proceedings of the Boston Society of Natural History." Vols. I.-XII. (1844-69), XIII.-XX., Parts 1-3 (1869-1880); "Berliner Entomologische Zeitschrift-herausgegeben von dem Entomologischen Vereine in Berlin." Jahrg. I.-XXXII. (1857-1888);

"The Geologist." Vols. I.-VII. (1858-1863); "The Geological Magazine, or Monthly Journal of Geology." 14 vols. (1864-1882); "The Natural History Review." 12 vols. (1854-1865); "Encyclopædia Britannica." 9th Edition. Vol. XXIV. (1888); "On the Anatomy of Vertebrates." By R. Owen, F.R.S. 3 vols.; "Elementary Text-book of Zoology." By Dr. C. Claus, translated and edited by A. Sedgwick, M.A. 2 vols.; "A Text-book of Physiology." By M. Foster, M.D., &c. 5th Edition, Part I. 1888; "A Text-book of the Physiological Chemistry of the Animal Body." By A. Gamgee, M.D., &c. Vol. I.; A Textbook of Pathological Anatomy and Pathogenesis." By Ernst Ziegler, translated by Donald Macalister, M.D. 2 vols.; "Elements of the Comparative Anatomy of Vertebrates." By R. Wiedersheim, adapted by W. N. Parker; "A Course of Elementary Practical Physiology." By M. Foster, M.D., and J. N. Langley, M.A., &c. 5th Edition; "The Elements of Embryology." By M. Foster, M.D., &c., and the late F. M. Balfour, M.A., &c.; "A Course of Elementary Instruction in Practical Biology." By T. H. Huxley, LL.D., &c., assisted by H. N. Martin, M.D., &c.; "An Introduction to the Osteology of the Mammalia." By W. H. Flower, LL.D., &c.; "Micro-Organisms and Disease." By E. Klein, M.D., &c.; "Anthropology." By E. B. Tylor, D.C.L., &c.; "A Course of Practical Instruction in Botany." Parts 1. and 11. By F. O. Bower, D.Sc., &c.; "Physiography." By T. H. Huxley, F.R.S.; "Lectures on the Physiology of Plants." By Julius von Sachs, translated by H. Marshall Ward, M.A.; "Outlines of Classification and Special Morphology of Plants." By Dr. K. Goebel, translated by H. E. F. Garnsey, M.A.; "Comparative Anatomy of the Vegetable Organs of the Phanerogams and Ferns." By Dr. A. de Bary, translated by F. O. Bower, M.A., and D. H. Scott, Ph.D., &c.; "The Geological History of Plants." By Sir. J. William Dawson, C.M.G., LL.D., &c.; "Geology-Chemical, Physical, and Stratigraphical." By Joseph Prestwich, M.A., &c. 2 vols.; "Three Expeditions into the Interior of Eastern Australia." By Major T. L. Mitchell, F.G.S., &c. 2 vols.; "Travels of a Naturalist in Japan and Manchuria." By Arthur Adams,

F.L.S., &c.; "A Course of Lectures on Electricity." By George Forbes, M.A., &c.; "The Story of Creation." By Edward Clodd; "Modern Theories of Chemistry." By Dr. Lothar Meyer, translated by P. Phillips Bedson, D.Sc., &c., and W. C. Williams, B.Sc. The following Journals, Magazines, &c., for 1889 as published: "The Athenaum;" "Annals and Magazine of Natural History;" "English Mechanic;" "Entomologist;" "Entomologists' Monthly Magazine;" "The Field;" "Geological Magazine;" "The Ibis;" "Journal of Anatomy and Physiology;" "Journal of Botany;" "Nature;" "Proceedings of the Royal Geographical Society;" "Quarterly Journal of Microscopical Science;" "Science Gossip;" "The Zoologist;" "The Scottish Geographical Magazine." "Transactions of the Royal Society of Edinburgh." Vols. VIII., XXI. (Part 4), XXII. (Parts 1 & 3), XXIII., XXIV., XXVI. (Part 4), XXVIII. (Parts 2 & 3), XXIX. (1817-80); "Transactions of the Royal Irish Academy." Vols. I.-X., XVI., XVII., XVIII. (Part 1), XIX., XXI. (Part 1), (1787-1846); "Charter and Statutes;" "Index, 1786-1813;" "Mémoires de la Société de Physique et d'Histoire Naturelle de Genève." Tomes I.-XXII, (1871-73); "Premier Supplément au Tome XII.;" "Table des Mémoires, &c., T. 1.-XX.;" "Abhandlungen herausgegeben von der Senckenbergischen Naturforschenden Gesellschaft, Frankfurt a/M." Band I.-XII. (1854-81); "Annales des Sciences Géologiques." T. I.-XX. (Parts 1 and 2) (1869-88); "Annales des Sciences Naturelles-Zoologie." 6º Série. T. XV., XVI., XIX., XX. (1883-85); "Botanique." 6e Série. T. XVII.-XX. (1884-85); "Archives de Zoologie Expérimentale et Générale." 2º Série. Tomes IV. et V. (1886-87); "Zeitschrift für wissenschaftliche Zoologie." XLVII. Band, 3 and 4 Hefts (1888); "Namen und Sachregister über Band XXXI.-XLV." "Notes from the Leyden Museum." Vol. X., No. 4 (1888); "The Geological Magazine." Vols. VIII.-X. (1871-73); New Series (Decade II). Vols. VII. and VIII. (1880-81); "Coloured Figures of English Fungi or Mushrooms." By James Sowerby, F.L.S. 3 Vols. and Supplement (1797-1803); "Curtis's Botanical Magazine." 3rd Series. Vol. XLIV. (1888); "Stettiner Entomologische Zeit-

ung." 49 Jahrg. (1888). "The Transactions of the Royal Irish Academy. Vols. XI.-XV.; XVIII.; XX.-XXVIII.; XXIX. (Parts 1-5), (1810-89); "Journal of Botany," n.s. Vols. VIII., No. 204 (December, 1879); IX.-XI. (1880-82); "Encyclopædia Britannica." 9th Edition, Index; "Nouvelles Archives du Muséum d'Histoire Naturelle, Paris." 2nde. Série. Tome X., Fasc. 2 (1888); "Notes from the Leyden Museum." Vol. XI., No. 1 (1889); "The Origin of Floral Structures through Insect and other Agencies." By the Rev. George Henslow, M.A., F.L.S., &c,; "The Morphology of the Skull." By W. K. Parker, F.R.S., and G. Bettany, M.A., B.Sc.; "Berliner Entomologische Zeitschrift-herausgegeben von dem Entomologischen Verein in Berlin." Band XXXII., Heft 2 (1888); "Stettiner Entomologische Zeitung." 50 Jahrg., Nos. 1-3 (1889). "Reichenbachia. - Orchids Described and Illustrated by E. Sander, &c." Vol. I. (12 parts); II. parts 1-5, [1888-89]; Vol. II., Part 7 (1888); "A History of British Fossil Reptiles." (4 vols). By Richard Owen, K.C.B., F.R.S., &c.; "Challenger Reports-Zoology. Vols. XXIII.-XXV., XXVII., XXVIII., XXIX. and XXX.; "Narrative." Vol. I., Part 1.

The first two parts of the fourteenth volume of our Proceedings have been already published, the third is in print, and the fourth will be issued at an early date.

The following abstract of the work which this volume represents may, I hope, be found of some assistance to the inquirer in following up references to other parts of our Proceedings, as well as to those of the sister scientific societies established elsewhere among the English-speaking communities of the southern hemisphere.

Since the beginning of 1889 we have received copies of the aforesaid Proceedings as follows, viz.:—

Royal Society of N.S.W., Vol. XXII., Part 2; Vol. XXIII., Part 1.

Royal Society of Tasmania, volume for 1888.

Royal Society of Victoria—Proceedings, Vol. I. (new series).

Royal Society of S. Australia-Proceedings, Vols. XI. and XII.

Royal Society of Queensland, Vol. V., Parts 4 and 5; Vol. VI., Parts 1-5.

Institute of New Zealand, Vols. XX. and XXI.

Royal Geographical Society of Australasia—

New South Wales Branch, none.

Victoria Branch, none.

Queensland Branch, Vol. III., Part 2; Vol. IV.; Vol. V., Part 1.

Australasian Association for the Advancement of Science, Vol. I., Sydney (1889).

Victorian Naturalist, Vol. V., No. 9, to Vol. VI., No. 8 inclusive.

The contributors to the current volume of our Proceedings are:

A. Sidney Olliff, F.E.S.—New species *Phyllodes* described, p. 113; New species Cetoniidæ, described by O. E. Janson, F.E.S. (communicated), p. 127; On Rhopalocera from Mount Kosciusko, p. 619; *Pielus hyalinatus* and its allies, p. 641; New species of Lampyridæ, p. 643.

Rev. J. E. Tenison-Woods, F.G.S., F.L.S., &c.—Vegetation of Malaysia, p. 9.

J. H. Maiden, F.L.S., F.C.S.—Geographical distribution of some N.S.W. plants, compiled from information given by Baron v. Mueller and Mr. W. Bauerlen, p. 107; On Eucalyptus Kinos—Part i. The Ruby Group, p. 605; Part ii. The Gummy Group, p. 1277; On Spinifex Resin, p. 629; On the Gum from Cedrela australis, p. 1047; On the Pharmacology of some Australian Plants by T. L. Bancroft, M.D. (communicated), p. 1061.

F. A. A. Skuse.—On the genus *Lestophonus*, with description of a new species, p. 123; Genus *Batrachomyia*, Macleay, MS., 2

species described, p. 171; Diptera of Australia. Part vi.—The Chironomidæ, p. 215. Part vii.—The Tipulidæ brevipalpi, p. 757.

- Rev. T. BLACKBURN, B.A., Corr. Mem.—Revision of the Genus *Heteronyx*. Part ii., p. 137. Part iii., p. 425. Part iv., p. 661. Supplement, p. 1217; Notes on Australian Coleoptera. Part iii., p. 445. Part iv., p. 707. Part v., p. 1247.
- J. Douglas Ogilby, F.L.S.—Australian Palæichthyes. Part ii., p. 178; *Hoplocephalus frontalis*, n.sp, described, p. 1027; *Lygosoma*, n.sp., and *Ablepharus*, n.sp., described, p. 1296.
- J. C. Cox, M.D., F.L.S.—On *Cypræa venusta*, Sow., p. 187; *Ancylus Smithi*. n.sp., and *Cypræa Irvineanæ*, n.sp., described, p. 658.

Baron von Mueller, K.C.M.G., &c., &c.—On the probable occurrence of *Aldrovanda vesiculosa* in N.S.W., p. 197; On *Eucalyptus Maideni*, n.sp., from N.S.W., p. 1020.

R. ETHERIDGE, JUNR. — On the Permo-carboniferous Fossils from N.W. Australia in the Macleay Museum, p. 199; Fructification of *Phlebopteris alethopteroides*, Lower Mesozoic of Queensland, p. 625; On the Biology of Lord Howe Island, p. 627; On the structure of *Conularia inornata*, and of *Hyolithes lanceolatus* with its operculum, p. 751.

Rev. Dr. Woolls, F.L.S.—On a collection of Plants obtained at King George's Sound by the Rev. R. Collie, F.L.S., p. 317.

Dr. Oscar Katz.—On the Bacillus of Leprosy, p. 325; On "Air-gas" for Bacteriological work, p. 328; On the Microbes of Chicken-cholera, p. 513.

- W. J. Stephens, M.A., F.G.S.—An attempt to synchronise the Australian, South African, and Indian Coal Measures. Part 1, Australia and New Zealand, p. 331.
- J. J. FLETCHER, M.A., B.Sc.—On the oviposition and habits of certain Australian Batrachians, p. 357; Notes on Australian Earthworms. Part vi., p. 987.

- J. D. Cox and A. G. Hamilton.—On the Birds of the Mudgee district, p. 395.
- T. W. Edgeworth David, B.A., F.G.S.—On the Origin of Kerosene Shale, p. 483.
- T. G. Sloane.—Review of the genus *Sarticus* (Carabidæ), p. 1288; Studies in Australian Entomology, No. ii. p. 1288.
- T. P. Lucas, M.R.C.S.—New species of *Iodis* described, with remarks on *Pielus imperialis*, Olliff, p. 603; On Queensland Macrolepidoptera, localities and new species, p. 1065.
 - J. Brazier, F.L.S.—On Mollusca trawled off Merimbula, p. 747.
- W. J. McKay, B.Sc.—Osteology and Myology of *Acanthophis antarctica*, p. 893.
- A. J. NORTH, F.L.S. On birds collected by Mr. E. H. SAUNDERS, near Roeburne, N. W. Australia, p. 1023; On the nidification of two Australian species of Birds, p. 1050; Of two species from Lord Howe Island, p. 1296; On *Sternula sinensis* breeding in N.S.W., p. 1296.
- C. W. DE VIS, M.A., Corr. Mem.—Tropidophorus Queenslandiæ, (Scincidæ), n.sp., and Perochirus Mestoni (Geckonidæ), n.sp., description, p. 1034.
- W. H. Miskin, F.E.S. Revision of the Australian species of *Euplea*, with 7 new species described, p. 1037.
- K. H. Bennett, F.L.S.—On the breeding of *Ibis falcinellus*, p. 1059.
- E. Meyrick, B.A., F.E.S.—Description of additional Australian Pyralidina, p. 1105; Revision of Australian Lepidoptera. Part iii., p. 1117.
- E. P. Ramsay, L.L.D., F.L.S., and J. D. Ogilby, F.I.S.— Lygosoma, n.sp., description, p. 1296.

I have classified the more important papers in the Australian Scientific Serials as follows, referring under each head to the authors of papers on similar subjects in the Linnean Society as enumerated above, and touching also on points of particular interest to Australian Students of Science which have been treated of elsewhere.

VERTEBRATES.

ANTHROPOLOGY.

Royal Society, N.S.W.—Vol. XXIII.: Aborigines of Australia. W. T. Wyndham.

New Zealand Institute.—Vol. XXI.: Col. Macdonnell on the Ancient Moa Hunters at Waingongoro. Communicated by James Park.

A Residence among the Natives of Australia. By K. Lumholtz. Bull. Am. Geog. Soc. XXI. 1; and Among Cannibals, an Account of Four Years' Travels in Australia and of Camp Life with the Aboriginals of Queensland. By the same author. London, J. Murray; Melbourne and Sydney, A. Petherick and Co.

MAMMALS.

Royal Society, South Australia.—Vol. XI.: On a new Australian Mammal. E. C. Stirling. See also Nature, XXXVII. p. 588; The Zoologist (3), XII. p. 424; Zool. Anz. XI. p. 647, &c.

New Zealand Institute.—Vol. XX.: On New Zealand Rats. A. Reischek, F. W. Hutton.

There is a note on the Nomenclature of the Short-eared New Zealand Bat (*Chalinolobus morio*, for *C. tuberculata*). Oldfield Thomas. Ann. and Mag. N.H. IV. 462.

The question as to the exact relations of the fossil Multituberculata (Fossil Marsupials—so called) to existing forms is discussed by H. F. Osborn (as quoted in last year's Address). Ac. Nat. Sc. Philadelph. p. 88. Upon this subject Prof. Cope (Amer. Naturalist, XXII. pp. 259, 723), referring to Mr. Poulton's observations upon the rudimentary and evanescent teeth of *Ornithorhynchus*, concludes that it is probable that the said Multituberculata are allied more nearly to the Monotremes than to the Marsupials,

The Fœtal Membranes of Marsupials are treated by Mr. Osborn in the Journal of Morphology, I. p. 2.

BIRDS.

Linnean Society, N.S.W.—Cox and Hamilton, North, Bennett.

Royal Society, Tasmania.—Anseranas melanoleuca in Tasmania. W. F. Petterd; Chibea bracteata in Tasmania. Col. Legge.

Royal Society, Queensland.—Vol. V. Australian Ancestry of the Crowned Pigeon of New Guinea; Colluricincla sibila, new species, description. Vol. VI.: Geosichla cuneata, new species; Sericornis gutturalis, new species, description; On Prionodura Newtoniana; Acanthiza squamata, new species; Pachycephala fretorum, new species, description. C. W. De Vis.

New Zealand Institute.—Vol. XX.: Ornithological Notes; Lobivanellus personatus in New Zealand. T. W. Kirk. Vol. XXI.: On some Birds from the Kermadec Islands; On Diomedea cauta. T. F. Cheeseman; On Diomedea exulans. A. Reischek; On Sula fusca. A. Hamilton; On Athene Novæ Zealandæ. W. Colenso; Birds of Lake Brunner district. W. W. Smith; On Apteryx Bulleri, new species. R. Bowdler Sharpe; On Notornis Mantelli in West Otago. James Park; On some New Zealand Birds. T. W. Kirk.

Victorian Naturalist V.—Oology of Australian Birds, Supplement, Part 5. A. J. Campbell.

REPTILES AND AMPHIBIA.

Linnean Society, N.S.W.—J. Douglas Ogilby, J. J. Fletcher, W. J. McKay, C. W. De Vis, E. P. Ramsay.

Royal Society, Queensland.—Vol. V.: *Miculia orientalis*, new species, description. Vol. VI.: *Neospades*, a new genus of Natricidæ. C. W. De Vis.

Australasian Association for the Advancement of Science, Section D.—On the Pineal Eye in *Hinulia* and *Grammatophora*. W. J. McKay; On a *Myxosporidium* infesting Australian Frogs. A. W. Fletcher.

The position of *Meiolania* is discussed by Baur and Boulenger in Ann. Nat. Hist. (6) III. pp. 54, 138; IV. p. 37.

R. Lydekker in Ann. and Mag. N.H. (6) IV. p. 475, remarks that fossil skulls of a small Labyrinthodont from the Karoo formation, S. Africa, agree so closely with *Bothriceps*, Huxley, presumably from the Hawkesbury beds of Australia that they may be regarded as indicating a new species of that genus, for which he proposes the name B. Huxleyi; and that this instance is paralleled by the occurrence of Cleithrolepis in both deposits. See Q.J.G.S. XLIV. p. 141.

FISHES.

Linnean Society, N.S.W.—J. D. Ogilby.

Royal Society, Tasmania (1888).—Concise History of the Acclimatisation of the *Salmonidæ* in Tasmania. P. S. Seager; Results of attempts to acclimatise *Salmo salar* in Tasmania. R. M. Johnston.

New Zealand Institute.—Vol. XX.: On a specimen of Regalecus. T. Jeffrey Parker; Fishes of Mokohinou Islands. F. S. Sandager.

MISCELLANEOUS.

Royal Society, Queensland.—Vol. VI.: Observations on a Natural History Collection made on the cruise of H.M.S. "Myrmidon" at Port Darwin and Cambridge Gulf (1888), with descriptions of new species of fishes and birds. W. Saville Kent.

Australasian Association for the Advancement of Science, Section D.—On the Nomenclature of the Sexual Organs in Plants and Animals. T. Jeffrey Parker.

MOLLUSCA.

Linnean Society, N.S.W.—J. C. Cox, J. Brazier.

Royal Society, N.S.W.—Vol. XXII.: On the Anatomy and Life-history of Mollusca peculiar to Australia. J. E. Tenison-Woods.

Royal Society, Tasmania.—Contributions for a systematic Catalogue of the Aquatic Shells of Tasmania. W. F. Petterd; Critical observations on the above; Variability of the Tasmanian *Unio*. R. M. Johnston.

Royal Society, South Australia.—Vol. XI.: Lamellibranch and Palliobranch Mollusca of South Australia; Census of the Molluscan Fauna of Australia; Gastropods of the Older Tertiary of Australia. R. Tate.

Royal Society, Queensland.—Vol. V.: Errata in list of Land Shells recorded from Queensland. H. Tryon; Limax Queenslandicus, n.sp., described; On Aneitea Graeffei and its allies, C. Hedley. Vol. VI.: Anatomical Notes on Helicide. Parts 1-3.; Notes on Queensland Land Shells. C. Hedley.

New Zealand Institute. –XX.: On Architeuthis longimanus. n.sp. T. W. Kirk; On Paryphanta lignaria, n.sp. F. W. Hutton.

Victorian Naturalist.—V.: On *Voluta undulata* and its allied species. R. Tate.

Australian Association for the Advancement of Science, Section D.—On some new or little known genera of Australian Mollusca. R. Tate.

The Rev. A. H. Cooke (P.Z.S. 1889, p. 136) discusses the generic position of the *Physæ* (so called) of Australia, concluding that they are in reality sinistral Limnæidæ, characteristic of the lands of the S.E. Pacific, Africa and the Mediterranean.

ARTHROPODA.

Insects, Spiders, &c.

Linnean Society, N.S.W.—A Sidney Olliff, F. A. A. Skuse, T. Blackburn, T. G. Sloane, T. P. Lucas, W. H. Miskin, E. Meyrick.

Royal Society, South Australia.—Vol. XI.: New South Australian Coccidæ. W. M. Maskell; New species Australian Coleoptera. T. Blackburn. Vol. XII.: *Hectoria Pontoni*, n.gen., n.sp.; On Pores in Veins of some Diptera. F. S. Crawford; Further notes on Australian Coleoptera, T. Blackburn.

Royal Society, Queensland.—Vol. VI.: New species Queensland Butterflies; New species Rhopalocera, description. T. P. Lucas; New species Australian Hesperidæ, description; Revision of the Australian species of the Lepidopterous genus *Terias*, with description, new species; Notes on some undescribed Australian Rhopalocera. W. H. Miskin.

New Zealand Institute.—Vol. XX.: Coccinella Nova Zealandia. W. Colenso; Supplement to Monograph on Noctuina of New Zealand; On New Zealand Geometrina; On New Zealand Pyralidina; On New Zealand Tortricina; On New Zealand Tineina. E. Meyrick; On Henops brunneus. W. M. Maskell; On new species of Araneidea. A. T. Urquhart; New species New Zealand Araneæ, description; Note on Amaurobioides maritima. P. Goyen. Vol. XXI.: On Gryllotalpa vulgaris in New Zealand. T. W. Kirk; On Gall-producing Insects in New Zealand. W. Maskell; On new species Araneidea; On new species Gasteracantha. A. T. Urquhart; New Zealand Micro-lepidoptera, new species, description. E. Meyrick; Natural History of three species of Micro-lepidoptera; Varieties of Declana floccosa. G. V. Hudson; Hemideina nitens, new species Locustidæ; On a peculiar Chrysalis; On Pyrameis gonerilla. W. Colenso.

Victorian Naturalist.—V.: On *Peripatus* in Victoria. A. Dendy. See also Nature XXXIX. pp. 366, 412; and *Peripatus*, Two monographs by A. Sedgwick, F.R.S. (Studies from the Morphological Laboratory in the University of Cambridge.)

The maturation of the Ovum in the Cape and New Zealand species of *Peripatus* is the subject of a paper by Lilian Sheldon Q.J.M.S. XXX. p. 1 (with 3 plates).

The Rev. O. P. Cambridge describes a very singular new genus of spider, *Chasmocephalon (C. neglectum)*, from Swan River. P.Z.S. 1889, p. 45.

CRUSTACEANS.

New Zealand Institute.—Vol. XX.: On Anthosoma Smithii. T. W. Kirk; Vol. XXI.: Distribution of the Freshwater Crayfish of New Zealand. Charles Chilton; Notes on New Zealand Crustacean Fauna. G. M. Thomson.

LOWER METAZOA.

ANNELIDES.

Linnean Society, N.S.W.—J. J. Fletcher.

Transactions of the Royal Society of Victoria.—Vol. 1. Part 1: The Anatomy of *Megascolides australis*. W. Baldwin Spencer.

Royal Society, Queensland.—Vol. VI.: On Filariæ of Birds. T. L. Bancroft.

The Australian Oligochætæ Cryptodrilus purpureus, n.sp., Acanthodrilus australis, n.sp., are described by W. Michaelsen (Mtthg. N.H. Mus. Hamburg, VI.).

POLYZOA.

A. W. Waters describes Bryozoa from N.S.W. (Ann. and Mag. N.H. (6) IV., p. 1).

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Victorian Naturalist.—Vol. V.: Geology of Arnhem's Land, Pts. I. II. J. E. T. Woods.

Australasian Association for the Advancement of Science, Section C .- On some salient points in the Geology of Queensland, Address by the President of the section, R. L. Jack; On the Metamorphic Rocks of the Omeo district, Victoria. A. Howitt; Age of the Mesozoic Rocks of the Lake Eyre Basin; Glacial Phenomena in S. Australia. R. Tate; Origin of the Laterite in the New England district; Cupriferous Tufts of the Passage Beds between the Permo-carboniferous and the Triassic beds in N.S.W. T. W. Edgeworth David; The Mesozoic Plains of S. Australia. H. Y. Lyell Brown; The Rocks of the Hauraki Goldfields. F. W. Hutton; Geological Sequence of the Bowning Beds. J. Mitchell; On boulders met with in the beds and reefs of the Gympie Goldfield. W. H. Rands; On the discovery of Fossils at Rockhampton. J. Smith; How can Australian Geologists safely rely upon the order of the Succession, &c. R. M. Johnston. Ibid., Section D.—On the Influence of Physiographic changes in the Distribution of Life in Australia, Address by the President of the Section, R. Tate.

The Department of Mines, Sydney, has published the two first parts of Vol. I. of Records of the Geological Survey of N.S.W., containing—(1) Notes on the Geology of the Barrier Range, Mt. Browne, &c., by C. S. Wilkinson; (2) two papers on Aboriginal remains, by T. W. Edgeworth David and R. Etheridge; (3) On a Lonsdaleia-like Coral; on Dromornis; on Cycadopteris scolopendrina Ratte, by R. Etheridge; (4) on a species of Lepidodendron from Goonoo Goonoo, by R. Kidston; (5) on the Ossiferous clays of Myall Creek; on the Fish and Plant beds of the Talbragar River, by W. Anderson, with other Petrological and Mineralogical papers. There appears a sharp discussion on the genera Nototherium and Zygomaturus in reply to Mr. Lydekker by C. W. De Vis, with note by the former, in Ann. and Mag. N.H. (6) IV., p. 257. I find also a paper on Atherstonia, n.g. Palæoniscida, from the Karoo formation; and on a tooth of Ceratodus

from the Stormberg beds, by A. S. Woodward (Ann. and Mag. N.H. (6) IV. p. 239).

In conclusion, Gentlemen, you will all remember the occasion when the hall in which we are now assembled was opened and presented to the Society with the unostentatious munificence characteristic of Sir William Macleay. You will also remember with what hearty and unanimous assent it was resolved to record our grateful appreciation of his action by a permanent token, in the form of a portrait executed in marble and erected here in a conspicuous place of honour.

This resolution was arrived at on October 31, 1885; but owing to unavoidable delay it was long before the committee appointed to carry it into effect, Dr. Cox and Mr. MacMahon, were able to complete their arrangements. At last however, on June 22, 1889, the excellent bust of Sir William Macleay, which you see before you, the design and handwork of Signor Simonetti, of Sydney, was formally unveiled. On that occasion I had the honour of giving some expression, though in inadequate terms, to the feelings with which this Society rightly regards their eminent benefactor, and of reminding you, by a brief summary of facts, of some of his principal services; and I think you will consider it not an improper use of the present opportunity if I now proceed to repeat, from a report in the Sydney Morning Herald, a small portion of what I had then to say upon the last head:—

"I can only enumerate a portion of the many and great benefactions by which Sir William Maclear has fully earned and fully gained the sincere and deep gratitude which we have met to testify by an enduring token. But I must remind you at least of his having borne all the expenses of our unfortunately brief establishment in the Garden Palace, of his gift of one admirable library of Natural History, which was to be consumed in the subsequent conflagration, only to be replaced by the still more costly, extensive, and, I may almost say, invaluable collec-

tion which you see upon the shelves around you, and which he is still from day to day expanding and enlarging in all directions. I must also remind you that he has from the time of that fire never ceased to entertain the Society in a home found for it by his own hospitality—first in an office, then in a commodious dwelling-house, and finally in this spacious hall, presented to the Society on the occasion to which I have already referred.

"Sir William Macleay has borne the greater part of the expenses of the Society's publications, has supplied the salaries of its officers, furnished its specialists with abundant funds for their investigations and their maintenance, and has equipped this establishment with its fittings, furniture and apparatus for research. He has moreover obtained for us the Charter under which the Society reckons upon permanence, perhaps for centuries to come. In the gift to the University of his magnificent collection for natural history, special provision is made that the Macleay Museum shall be available for all purposes of study and research to members of this Society on equal terms with the members of the University. Moreover in the noble foundation which he is establishing for the support or assistance of real investigation and original workers in Science, he has once more shown how completely he has identified himself with this Society by throwing upon the Council the whole and sole responsibility of selecting among duly qualified candidates for his Linnean Fellowships, those who shall show and give promise of the greatest aptitude and industry for their several and special line of research. He has arranged to bequeath-may it be long before the bequest fall due!—the sum of £35,000 for the establishment of four "Linnean Fellowships" of the annual value of £400 each, tenable for one year only at a time, but open to renewal year after year upon satisfactory proof being given to the Council that the holder has laboured during the preceding term with earnestness, perseverance, and success.

"Whether the distinction which has been recently conferred by the Crown on our member is in any way due to the work which he has carried on in this Society, I can only conjecture; and there are so many grounds upon which the Crown might have been well advised to grace him with this honour, that I feel some hesitation in forming that conjecture. But in any case we congratulate ourselves also when we congratulate a fellow member upon his well earned dignities."

Now gentlemen,-I have no doubt that our friend Sir WILLIAM MACLEAY would have preferred that these remarks should not have been repeated here to-day, even though their expression might have been on the first occasion unavoidable. regard it as no unimportant part of my duty as President, to take care that not only all the members of our own Society, but also those of kindred associations in Australia and elsewhere should be made acquainted in some degree with the kind of assistance and the extent of support which Natural Science has in this country received from his unstinted liberality. In such a case, silence would betoken ingratitude. And in the second place I cannot but consider that the whole Australian people is very much interested in such examples as this of the life of Sir William MACLEAY, displaying as it does both the energy and perseverance requisite for the honourable acquisition of wealth, and the rarer qualities of understanding how that wealth may best be applied to advance the public intelligence and welfare, and of perfect generosity in devoting it to that service.

FLOREAT SOCIETAS LINNEANA!

On the motion of Mr. Trebeck, a vote of thanks was accorded to the President for his interesting address. Mr. Trebeck also gave expression to the feelings of honour and esteem in which Sir W. Macleay is held by the members of the Society.

The following gentlemen were elected

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INDEX TO VOL. IV.

(SECOND SERIES.)

NAMES IN ITALICS ARE SYNONYMS.

PAGE	1	PAGE
Abacetus 723, 724, 726	Acanthus ilicifolius	26
angustior 727	Accipiter cirrocephalus	397
ater 727	Achimenes cherita	99
australis 723, 724, 726, 727	Achras mammosa	95
crenulatus 726	sapota	94
flavipes 724, 726, 727	zapotilla	95
Macleayi 727		1188
simplex 726, 727		1131
Abauria 16	Acroloxus	659
Abrus precatorius 26		3, 79
Abutilon 19	(Polybotrya) ap-	
venosum 97	pendiculatum	79
Acacia 1207	(Elaphoglossum)	
alata 319, 321	conforme	79
discolor 414, 1053	contaminans	79
longifolia 654	drynarioides	79
obtusata 108	(Gymnopteris)	
pulchella 319, 321	minus	79
A calles conifer 1273	(Stenochlæna)	
Acalypha 18	palustre	79
indica 100	(Photinopteris)	
marginata 100	rigidum	79
Acanthias 179, 185	sorbifolium	79
blainvillii 185	spicatum	79
megalops 185	subrepandum	79
vulgaris 185	variabile	79
Acanthiza lineata 409	Actinodaphne	18
nana 409	Actinotus minor	109
pusilla 409		732
Acanthodrilus 987	Adenandra dumosa 2	9, 97
australis 1000	Adenanthos cuneata 318	, 321
Macleayi 999	Ægialitis nigrifrons 419,	1025
Acanthophippium 63	Ægiceras majus 2	4, 25
javanicum 68	Ægle marmelos	83
Acanthophis antarctica 893, 908, 912		399
913, 914, 916, 926, 927, 932, 935,		68
937, 938, 941, 951, 955, 957, 968,		68
969, 972, 976, 978, 1297	suaveolens	68
Acanthorhynchus tenuirostris 414	suavissimum	68

ii. INDEX.

		PAGE			PAGE
Ærides superbum		68	Alpinia nutans		, 100
tæniale		68	Alsophila andersoni		75
virens	•••	68	commutata		75
773 1 (1)		1, 99	glabra		75
		100	J 1	•••	75
Agapanthus umbellatus			۲۰ ۰	•••	
Agaphthora melanora		1087	kingi	•••	75
sphenodes		1087	latebrosa	•••	75
Agathia asterias	•••	1094	obscura	•••	75
laetata	•••	1094	trichodesma		75
Agave americana	•••	100	Alstonia	•••	19
Ageratum conyzoides		15	macrophylla		29
mexicanum	•••	98	scholaris		29
Agetinus æqualis		465	Alstrœmeria aurea		101
Aglaodorum	•••	22	braziliensi		101
Aglaophenia sinuosa		633	Alternanthera		20
	•••	320		•••	1112
Agonis	• • • •		Alucita pygmæa	• • • •	
flexuosa	•••	318	xanthodes		1112
marginata	••	318	Alytes	:::	359
theæformis	**1	318	obstetricans	378	8, 379
Agonocheila	•••	715	Alyxia		19
cribripennis		715	Amalopis	758, 759	9, 888
lutosa	715	, 716	congrua		
Agonum		740	inconstans		889
Agrostis breviglumis		110	nigritarsis		888
A	1052,		1		18
- , , .		1052	A , *	•••	20
A 1 11				1070	
Ainsliæa	•••	15	Amarygmus	1272,	1273
Alasion	•••	219	bicolor		1273
Alaus Darwini	•••	1259	convexus		1272
funebris		1261	tardus	1271,	
Albizzia	3	1, 33			[1273]
Alcyone azurea		402	uniformis		1272
Aldrovanda	197	, 198	Amaryllis belladonna		100
vesiculosa	197	, 198	hippeastrum		100
Alethopteris australis 334	4. 336.	340.	ignescens		100
11100110 profits addition to	-, 000,	[342	Amathia bicornis		633
Currani		337	convoluta		633
Aleurites moluccana	•••	102	TTT'I '		633
	•••	98	A 11 1	•••	19
Allamanda aubletii	•••			•••	
cathartica	•••	98	Amerila astreas	•••	1086
neriifolia	••	98	brachyleuca	•••	1086
nobilis	•••	98	rubripes	•••	1086
schottii	• • • •	98	serica		1086
violacea		98	Amherstia		16
Allolobophora fœtida		988	nobilis		97
turgida		997	Amomum		22
Allophyllus	•••	20	Amorphophallus		30
Alocasia		, 100	Ampelocissus	•••	21
2 1*		102	Amphineurus		800
macrorrhiza		102	Amphipleura pellucida	•••	390
A 7	•••	22		459	
	•••		Amphirhoe decora		3, 454
carinata	•••	100	Sloanei	408	3, 454
Alpinia	•••	22	Amplexus	•••	351

INDEX.

	1	PAGE		PAGE
Amydrium	•••	22	Antigona	748
Anacardium occidentale		92	Antocha	795, 796
Anamirta		56	Antrophyum latifolium	
Ananassa sativa		96	nanum	79
Anarthria scabra		320	reticulatu	
prolifera	••	320	semicostat	
Anas castanea		422	Apate	1262, 1264
1		422	collaris	1262, 1263
Anchomenus livens	•••	741	T 1 11	1263
	••	740	a la mina a	1000
nigro-æneus Ancistrocladus	•••	36	A 1 7 T	1261, 1262
	•••	659		
Ancylastrum	•••		Aphanococcus	
Ancylus	•••	659	Aphelandra cristata	
australasicus	0.00	659	fascinator	439
Smithi 633,		, 660	Aphodius	1140
Andersonia	•••	320	Aplasta	1140
micrantha	•••	318	Apogon	219
sprengelioides	•••	318	Aporosa	775
Aneilema	• • • •	22	Aporosa macrophylla	40
Anerincleistus		18	villosa	40
Anestia inquinata		1083	Aporum	62
Aneurystypus		1254	indivisum	65
Angelonia floribunda		99	leonis	65
Anginalloa		60	sarcostomum	65
Angiopteris evecta	7	4, 80	sinuatum	65
Angophora intermedia		397	Aprosmictus erythropte	
Angræcum		63	scapulatus	
A 7		887	Aquila audax	398
A ' 2 22	•••	24	Aralia	21
A		36	Araucaria	22
4 7 0	•••	41	Ardea novæ-hollandiæ	420, 1025,
A 1 1 11	•••	63	Ardea novæ-nomandæ	[1060
Anœctocheilus	• • • •	69	manifera	
dawsonianus			pacifica	420, 1059
lowii	•••	69	Ardetta minuta	•••
setaceus	•••	69	Ardisia	98
xanthophylli	us	69	Areas marginata	1086
Anomalops palpebratus	• • •	312	Areca	34, 46, 52
Anomianthus		19	horrida	54
Anona cherimolia		80	malayana	52
muricata		80	tigillaria	54
reticulata		80	Arenga	34, 48
squamosa		80	saccharifera	47
Anoplistes		860	Argutor	734
Anseranas melanoleuca		421	antipodum	733
		1093	australis	732
intermedia 1091,			foveipennis	733, 734
janetta		1092	nitidipennis	733, 734
A . 47 * 47 * 47 * 4		417	occidentalis	734
Anthochæra carunculata	•••	414	oodiformis	733, 734
		410	1 A •	19
		30		1201
	•••	18		
Antidesma	•••		lasiocamparia	1202
bunius	•••	25	lutosaria	1202

iv. INDEX.

PAGE	PAG
Arhodia retractaria 1202	A 1
semirosea 1202	
Aristida ramosa 110	
Aristida ramosa 110 Arrhodia 1139, 1201	squamulatum 7 subavenium 7
lasiocamparia 1202	
F00	
Artaba 796 Artamus personatus 402	
	Astræus major 1257, 125
sordidus 402, 404	1.111.0001.01
superciliosus 402, 410, 1050	Meyricki 1256, 1257, 125
Arthonia 103	pygmæus 125
Artocarpus 17, 29, 33	Samouellei 125
blumei 89	Tepperi 125
elastica 89	Astronia 18, 4
incisa 89	papetaria 4
integrifolia 89	Astrotricha longifolia 10
Arundina densa 67	Astur approximans 39
speciosa 67	Novæ-Hollandiæ 39
Arytera 20 Ascaris sp 1100 Ascidium 103	Asura cervicalis 108
Ascaris sp 1100	var. aurata 108
Ascidium 103	lydia 108
Ascopodaria fruticosa 633	Asystasia 1
Asparagus 22	Asystasia 1 coromandeliana 9
Aspidium aculeatum var. biar-	Ataceia cristata 72, 10
istatum 77	Athemistus bituberculatus 74
auriculatum var.	Atherandra 1
cœspitosum 77	Atherosperma 106
	Athyris 208, 20
auriculatum var.	Athyris 208, 20 Macleavana 208, 209, 21
auriculatum var. marginatum 77	Atherandra 1 Atherosperma 106 Athyris 208, 20 Macleayana 208, 209, 21 Roysii 20
auriculatum var. marginatum 77 cicutarium 77	Athyris 208, 20 Macleayana 208, 209, 21 Roysii 20 Atrypa 35
aurieulatum var. marginatum 77 eieutarium 77 leuzianum 77	Atrypa 35
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77	Atrypa 35 Atyphella 645, 646, 1297, 129
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 1ychnus 644, 647, 648, 650
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 650 [651, 129
auriculatum var. marginatum 77 cicutarium feuzianum melanocaulon membranaceum pachyphyllum singaporianum subtriphyllum	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 650 scintillans 65
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 subtriphyllum 77 variolosum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 650 scintillans 65
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 subtriphyllum 77 variolosum 77 vastum 77	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 subtriphyllum 77 variolosum 77 variolosum 77 Aspilates 1137, 1139, 1196, 1197	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 neelanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 subtriphyllum 77 variolosum 77 variolosum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 vastum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 borneense 77	Atrypa
auriculatum var.	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 vastum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 borneense 77 caudatum 77 cordifolium 77	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 vastum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 caudatum 77 cordifolium 77 cuneatum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 scintillans 65 Aucuba japonica 9 Augomela hypochalcea 127 Aulacodiscus 127 australis 127 Averrhoa bilimbi 9 Avicennia officinalis 2 Aviculopecten 35 tenuicollis 20
auriculatum var.	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 scintillans 65 Aucuba japonica 9 Augomela hypochalcea 127 Aulacodiscus 1 Aulacophora analis 127 australis 127 Averrhoa bilimbi 9 Avicennia officinalis 2 Aviculopecten 35 tenuicollis 20 Azolla rubra 7
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 variolosum 77 vastum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 borneense 77 caudatum 77 cuneatum 77 esculentum 77 falcatum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 scintillans 65 4, 647, 648, 656 Aucuba 9 5 Augomela hypochalcea 127 127 Aulacodiscus 1 127 Aulacophora analis 127 127 Averrhoa bilimbi 9 9 Avicennia officinalis 2 2 Aviculopecten 35 12 Azolla rubra 7 7 Bacillus anthracis 58
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 vastum 77 chordota 1196 Asplenium amboinense 77 belangeri 77 borneense 77 caudatum 77 cordifolium 77 esculentum 77 falcatum 77 hirtum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 scintillans 65 Aucuba japonica 9 Augomela hypochalcea 127 Aulacodiscus 1 Aulacophora analis 127 australis 127 Averrhoa bilimbi 9 carambola 9 Avicennia officinalis 2 Aviculopecten 35 Azolla rubra 7 Bacillus anthracis 58 Bæckea 1
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 nelanocaulon 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 variolosum 77 variolosum 77 vastum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 borneense 77 caudatum 77 caudatum 77 condifolium 77 esculentum 77 hirtum 77 lineolatum 77	Atrypa
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 variolosum 77 variolosum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 caudatum 77 caudatum 77 cuneatum 77 hiredatum 77 hirtum 77 lineolatum 77 longissimum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 scintillans 65 Aucuba japonica 9 Augomela hypochalcea 127 Aulacodiscus 127 Aulacophora analis 127 Averrhoa bilimbi 9 carambola 9 Avicennia officinalis 2 Azolla rubra 7 Bacillus anthracis 58 Bæckea 1 crenulata 10 fyutescens 10
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 subtriphyllum 77 variolosum 77 vastum 77 Aspilates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 borneense 77 caudatum 77 cordifolium 77 esculentum 77 hirtum 77 longissimum 77 longissimum 77 macrophyllum 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 scintillans 65 Aucuba japonica 9 Augomela hypochalcea 127 Aulacodiscus 127 Aulacophora analis 127 Averrhoa bilimbi 9 carambola 9 Avicennia officinalis 2 Azolla rubra 7 Bacillus anthracis 58 Bæckea 1 crenulata 10 fyutescens 10
auriculatum var. marginatum 77 cicutarium 77 leuzianum 77 melanocaulon 77 membranaceum 77 pachyphyllum 77 singaporianum 77 variolosum 77 vastum 77 vastum 77 chordota 1196 Asplates 1137, 1139, 1196, 1197 chordota 1196 Asplenium amboinense 77 belangeri 77 caudatum 77 cordifolium 77 caudatum 77 falcatum 77 hirtum 77 lineolatum 77 longissimum 77 macrophyllum 77 nidus 73, 77	Atrypa 35 Atyphella 645, 646, 1297, 129 flammans 65 lychnus 644, 647, 648, 656 [651, 129 65 Aucuba japonica 9 Augomela hypochalcea 127 Aulacodiscus 1 Aulacophora analis 127 Averrhoa bilimbi carambola 9 Avicennia officinalis 2 Aviculopecten 35 Azolla rubra 7 Bacillus anthracis 58 Bæckea 1 crenulata 10 frutescens 8

INDEX. v.

Balliace vetustaria	1206	Blumea hieracifolia	•••	15
Bambusa tulda	40	Blyxa roxburghii		71
Banksia Brownii	319, 321	Boa caninæ	•••	979
coccinea,	319, 321	constrictor	•••	927
grandis	319, 321	Bolbophyllum		62
Barleria	18	adenopetalum	•••	65
cærulea	99	beccari		65
Barringtonia	18	calmarium		65
Bassia	20, 33, 95	limbatum		65
Bathilda ruficauda	1029	lobbii		65
Batrachomyia 171	, 173, 174	pileatum	•••	65
nigritarsis 175	, 177, 189	purpureum		65
quadrilineata	172, 173,	vaginatum		65
	, 177, 189	Bophrosia		888
Bauhinia 16, 3		Borassus flabelliformis	•••	46
tomentosa	58	Boronia Barkeriana	•••	108
Beaumontia	19	pilosa		, 111
multiflora	98	rhomboidea		, 111
Bedfordia salicina	1100	spathulata		319
	20, 98	T		19
Belemnites elongatus	640	Boschia Bossiæa Kiamensis	•••	108
	0.40		210	, 321
otapiriensis Belenois teutonia		Preissii		
Delidens sinches	623	Bostrychus	•••	1261
Belideus cinereus	1030	Jesuita		1261
flaviventer	1030	Botaurus poicilopterus	•••	421
Bellerophon d'Orbignii	206	Bouea gandaria	•••	93
Bennettia	22	Bougainvillea glabra	97	, 100
Bergsmia	22	Brachyscelis duplex		312
Berosus affinis	448	munita		1054
approximans	448	pileata		1054
auriceps	447	Brama rayi	•••	1028
Australiæ	448	Branta jubata	•••	421
discolor	448	Brephos 1138, 1	167,	
duplopunctatus	448	Breweria	•••	19
Flindersi	448	Bromheadia finlaysonianun	1	67
ovipennis	448	palustris	• • •	67
sticticus	448	Bromicolla aleutica		492
_ stigmaticoll i s	448	Broudelia	•••	659
Bertya gummifera	108	Brugmansia arborea		99
Biguonia grandiflora	99	Bruguiera		24
radicans	99	Brunfelsia eximia		99
ungua	59	Brunia fragilis		1070
venusta	99	harpophora		1070
Billardiera variifolia	319	intersecta		1070
Bixa orellana	97	replana		1070
D	422	repleta		1070
Biziura lobata Blakea	44	Bryophyllum		312
Blandfordia cunninghamii	100	calycinum		98
flammea	100	Bucephalandra		22
nobilis 100		Buchanania	•••	20
Blechnum findlaysonianum	77	latifolia		40
orientale	77	75 177 '	•••	21
Blumea		Day address and a	•••	19
DIMITION	[1]	Duettneria		1.7

vi. INDEX.

	1	PAGE		т	PAGE
Bungarus	•••	931	Callista		749
Burbidgea		22	Callistemon linearis		108
D	•••	224	C 111. 1 1	•••	70
D	•••	34	Callitriche verna Calochilus paludosus	•••	109
	•••	416		•••	21
Cacatua galerita	•••		Calophyllum	•••	
gymnopis	41.0	632	inophyllum	3:	91
roseicapilla		, 557	Calopsittacus novæ-holland		417,
sanguinea		632	0.1.4	_	1025
Cacomantis flabelliform		416	Calotes	•••	962
pallida	•••	416	cristatellus	•••	632
Cadius		1270	Calotropis gigantea	•••	99
Cænarthria		, 863	Calyptorhynchus Banksii		416
viridis	878	, 880	funereus		416
Cæsalpinia	•••	16	Solandri		416
Cajanus indicus		101	Calythrix		44
Caladenia clavigera		1100	Camellia japonica		97
Caladium	34	, 100	Campephaga humeralis	• • •	405
Calamidia hirta		1067	Camptocladius 21	5, 224	, 261
salpinetis		1067	crassipenni	s	262,
Calamites		333		[264,	, 309
Calamoherpe australis		410	invenustul		262,
Calamus 30, 34	4, 50, 56,	1050		[265.	, 309
gracilis	• • • • • • • • • • • • • • • • • • • •	40	Macleayi	262	, 266
grandis		30	terjugus		, 309
rotang	••	30	vestitus		, 263
rudentum		30	Canarium	29, 3	3, 94
scipionum		30	commune		4, 97
Calanthe		63	dichotomum		94
abbreviata		68	Canavalia ensiformis		57
angustifolia	•••	68	obtusifolia		57
circuligoides	***	68	Canna indica		100
emarginata	•••	68	Canthydrus Bovillæ	•••	446
furcata		68	guttula		446
parviflora		68	Capparis	•••	21
pulchra	•••	68	Capsicum		20
speciosa	•••	68	Carallia	•••	24
veitchii		68	Carapa moluccensis	•••	25
veratrifolia	•••	68	Cardita amabilis	• • •	748
vestita	•••	68	Carenidium lacustre		1289
Caleya minor		109		1249,	
Callicarpa		19	arenarium		1289
arborea	•••	41	campestre		1290
longifolia	•••	27	habitans	1288,	
Callicoma serratifolia		108	ineditum	,	717
Calligenia cyclota	•••	1071	lepidum	1288,	
melitaula		1071	Macleayi		
pyraula		1071	odewahni		1291
structa		1071	opulens	1288,	
Calliplæa darchia		1039	planipenne		1294
niveata		1000	rugatum		1288
priapus		1000	0		1289
tulliolus		1039			717
Calliscapterus campes		716		1293,	
- Aller Profits Campos		,10	1200,	1200,	

Careya arborea 40 Ceratopogon latipennis, 292, 308, 310 Carican papaya 88 marmoratus 292, 304, 305, 305 Carionia 13 Caryota 34 Mastersi 292, 297, 310 coccinea 555 minusculus 292, 299, 310 310 coccinea 555 minusculus 292, 299, 310 310 sobobilfera 555 molestus 292, 305, 310 310 urens .52, 55 pulicaris 222 293, 300, 310 cassia .16, 31 pulicaris 222 296, 310 alata 28 fistula 97 saltivagus 292, 295, 310 cassinia denticulata 109 saltivagus 292, 295, 310 soutellatus 304 Cassinia denticulata 109 castanea 293, 35, 55, 56 creatinulatic		PAGE	PAGE
Caricia papaya 88 marmoratus 292, 304, 305, [310] Carionia 13 Mastersi 292, 297, 310 coccinea 55 minusculus 292, 297, 310 cumingii 55 minusculus 292, 293, 310 obtusa 55 minusculus 292, 293, 310 sobolifera 55 minusculus 292, 293, 310 curens 55 minusculus 292, 305, 310 curens 16, 31 molestus 292, 305, 310 alata 28 sistula 97 sepiaria 28 saltivagus 292, 295, 310 Cassisi pyrum 747 Sastanopais 292 295, 310 Castanopsis 41 Castanopsis 293, 35, 55, 56 tribuloides 41 Castanopsis 293, 33, 55, 56 Casuarina 1129, 1131 Ceriops 224 Casuarina 1226 Ceriops 24 Caulobius 1226 Ceriops 24 Cedrela australis 107	Careva arborea	40	
Caryota			marmoratus 292, 304, 305,
Caryota		13	
Coccinea	Carvota	34	Mastersi 292, 297, 310
Cumingii		55	
Obtusa	cumingii	55	
Sobolitera	. 1. 4		
Cassia	sobolifera	55	
Cassia			
Alata	Cassia	16, 31	
fistula	a la ka		
Sepiaria	fistula	97	saltivagus 292, 295, 310
Cassinia denticulata 109	sepiaria	28	scutellatus 304
Cassinia denticulata 109 subnitidus 292, 299, 310 Castanea 29, 33, 55, 56 tribuloides 41 Castanopsis 29, 33, 55, 56 Ceratopteris thalictroides 72, 77 Casuarina 1129, 1131 Cerbera 19 Catamixis 15 Cerbera 19 Caulobius 1253 Ceropegia 19 Cavonus 1253 Cerozodia 758, 838, 885 Cecidomyia sp. 654 Cerozodia 758, 838, 885 Cedela australis 107, 1047 Chalcolamira accurata 399 Celotisa 20 Celtis 104 Centoloba 1114 Adelaide Centropseustis 1105 Hursti 480 Ceratodus 356, 979	, ~	28	
Castanea		109	subnitidus 292, 299, 310
Castanea	Cassis pyrum	747	Sydnevensis 292, 302, 310
Castanopsis		29, 33, 55, 56	
Castanopsis 29, 33, 55, 56 argentea			
Casuarina 1129, 1131 Ceriops 24 Ceropegia 758, 838, 885 Cauonus 1253 armatus 1253, 1254 Cestracion 185 Cestracion 185		29, 33, 55, 56	0 1 -
Casuarina 1129, 1131 Ceriops 24 Catamixis 15 Ceropegia 19 Caulobius 1253 Cerozodia 758, 838, 885 Cavonus 1253 1254 Cerozodia 758, 838, 885 Cecidomyia sp. 654 Cestracion 185 Cedrela australis 107, 1047 Chacur candidum Celosia Cestrum candidum Cestrum candidum Cestrum candidum Cestrum candidum			
Catamixis 15 Ceropegia 19 Cavonus 1253 Cerozodia 758, 838, 885 Cavonus 1253 1254 Cerozodia 758, 838, 885 Cecidomyia sp. 654 Cestrum candidum 185 Cedrela australis 107, 1047 Chatina caudacuta 399 Chalcitar caudacuta 399 Celosia 20 Chalcitar caudacuta 399 Celosia Chalcitar caudacuta Chalcites basalis <td>a .</td> <td>1129, 1131</td> <td>1 0 .</td>	a .	1129, 1131	1 0 .
Caulobius 1226 Cavonus 1253 armatus 1253, 1254 Cecidomyia sp.	a		Company to the contract of the
Cavonus 1253 1254 Cestracion 185 Cedidomyia sp. 185 Cedrela australis	0 11.	1226	
Cecidomyia sp.	(1)	1253	interrupta 886
Cecidomyia sp. 654 Cestrum candidum 99 Cedrela australis 107, 1047 Chatura caudacuta 399 Toona 1047, 1048 Chailia Tacca 73 Celosia 20 Chalcites basalis 416 Celtis 17 Chalcolampra acervata 480, 481, 482 Chalcolampra acervata 480, 482 Chalcolampra acervata 480, 482	t	1253, 1254	Masternation = 30#
Cedrela australis 107, 1047 Chaetura caudacuta 399 Toona 1047, 1048 Chalina Tacca 73 Celosia 20 Chalcites basalis 416 Cenloba 1114 Chalcolampra acervata 480, 481, 482 Cendurea depressa 98 enea 481 Centaurea depressa 98 enea 481 Centropseustis 1105 distinguenda 482 Centropus phasianus 1025 Hursti 480 Cephalomappa 18 marmorata 480 Ceratodus 356, 979 pacifica 480, 482 Ceratophyllum 69 pacifica 480, 482 Ceratopogon 215, 217, 218, 219, 220, 221, 222, 223, 225, Chalcomela illudens 479 Chalcomela illudens 480 480 480 Chalcomela illudens 479 Chalcomela illudens 479 Chalcomela illudens 480 Chalcomela illudens 481 Chalcopterus 60 Chalcopterus 1045 Ch		·	
Toona			Chasterns
Celosia 20 Chalcites basalis 416 Celotis 17 17 416 plagosus 416 Centoloba 1114 Chalcolampra accervata 480, 481, 482 481 Chalcolampra accervata 480 481 482 481 Chalcolampra accervata 480 481 482 481 482 Centorpseustis 105 distinguenda 482 480 481 482 Centorpseustis 105 distinguenda 482 480 482 Centorpseustis 1025 luteicornis 480 482 Centorpseustis 480 482 Centorpseustis 480 482 Centorpseustis 481 Marmorata 481 Marmorata 481 482 Ceratorpseustis 481 Ceratoris 480 482 Ceratorpseustis 481 Chalcomel	TT.		Chailia Wassa
Celtis 17 Cenoloba 1114 Chalcolampra acervata 480, 481, 482 Obliteralis 1114 Adelaidæ 480 Centaurea depressa 98 enea 481 Centropseustis 1105 distinguenda 482 Centropus phasianus 1025 luteicornis 480 Centropus phasianus 125 luteicornis 480 Centropus phasianus 125 luteicornis 480 Centropus phasianus 125 luteicornis 480 Ceratodus 356, 979 pacifica 480, 482 repens 481, 482 Ceratophyllum 69 Ceratophyllum 69 Ceratopogon 215, 217, 218, 219, 220, 223, 225, 225, 226, 289, 310, 311 Chalcopterus 1273 Chalcopterus 1273 <t< td=""><td>0.1</td><td>, 00</td><td>Ob -1-14 1 11</td></t<>	0.1	, 00	Ob -1-14 1 11
Cenoloba 1114 Chalcolampra acervata 480, 481, 482 obliteralis 1114 Adelaidæ 479 Centaurea depressa 98 ænea 481 Centropseustis 1105 distinguenda 482 Centropus phasianus 1025 luteicornis 480 Cephalomappa 18 marmorata 480 Ceratodus 97 pacifica 480 482 Ceratodus 481 480 Ceratodus 480 480 480 480	0.11		
obliteralis 1114 Adelaidæ 479 Centaurea depressa 98 ænea 481 Centropseustis 1105 distinguenda 482 centropus phasianus 1025 luteicornis 480 Centropus phasianus 1025 luteicornis 480 Cephalomappa 18 marmorata 481 Ceratodus 482 Ceratodus 482 Ceratophyllum			
Centaurea depressa			A 3-1-13 1 400
Centropseustis 1105 distinguenda 482 astropora 1106 Hursti 480 Centropus phasianus 1025 luteicornis 480 Cephalomappa 18 marmorata 481 Ceratodus 97 pacifica 480, 482 Ceratopolyllum 69 repens 481, 482 Ceratopogon 215, 217, 218, 219, 220, Chalcomela illudens 479 221, 222, 223, 225, Chalcometa illudens 479 Ceratopogon 215, 217, 218, 219, 220, Chalcometa illudens 479 226, 289, 310, 311 &qualis 292, 303, 310 Corinna 1045 Amapa Angasi 1045 Charagia 1127 Arcustus 201 charagia 1127 Arcustus </td <td></td> <td>0.0</td> <td>403</td>		0.0	403
astropora 1106 Centropus phasianus 1025 Cephalomappa 18 Ceratodus 356, 979 Ceratonia siliqua 97 Ceratophyllum 69 Ceratopogon 215, 217, 218, 219, 220, 221, 222, 223, 225, 226, 289, 310, 311 æqualis 292, 294, 310 albopunctatus 292, 303, 310 albopunctatus 306 bipunctatus 306 bipunctatus 306 bipunctatus 221 decempunctatus 292, 301, 130 femoratus 221 imperfectus 292, 307, 310 lignivora 1480 luteicornis 480 luteicornis 480 luteicornis 480 Chanarmarata 481 Chalcomela illudens 479 Chanapa Angasi 1273 Chanapa Angasi 1045 Charagia 1045 lignivora 1132 eximia 1132 eximia 1132 lignivora 1129			1' 1' 7 100
Centropus phasianus 1025 luteicornis 480 Cephalomappa 18 marmorata 481 Ceratodus 356, 979 pacifica 480, 482 Ceratodus siliqua 97 repens 481, 482 Ceratophyllum 69 rufipes 481 Ceratopogon 215, 217, 218, 219, 220, 223, 225, 226, 289, 310, 311 Chalcomela illudens 479 Education and the company of			TT
Cephalomappa 18 marmorata 481 Ceratodus 356, 979 pacifica 480, 482 Ceratopia siliqua 97 repens 481, 482 Ceratophyllum 69 Chalcomela illudens 481 Ceratopogon 215, 217, 218, 219, 220, 223, 225, 225, 223, 225, 225, 223, 310 Chalcomela illudens 479 Chalcopterus 1045 1045 æqualis 292, 294, 310 1045 arcuatus 1045 Charagia			1-4-:
Ceratodus 356, 979 pacifica 480, 482 Ceratophyllum 97 repens 481, 482 Ceratophyllum 69 rufipes 481, 482 Ceratopogon 215, 217, 218, 219, 220, 221, 222, 223, 225, 226, 289, 310, 311 Chalcomela illudens 479 226, 289, 310, 311 caratipennis 292, 303, 310 1045 dalbopunctatus, 292, 293, 310 arcuatus 206 1045 bipunctatus 291 eximia 1132 decempunctatus 292, 301, 310 ingens 1134 femoratus 221 Lewinii 1129 imperfectus 221 Lewinii 1129	Cephalomappa		
Ceratonia siliqua 97 repens 481, 482 Ceratophyllum 69 Ceratopogon 215, 217, 218, 219, 220, 225, 221, 222, 223, 225, Chalcopterus 479 226, 289, 310, 311 226, 289, 310, 311 Chanapa Angasi 1045 280, 292, 294, 310 Lewini 1045 280, 289, 310, 311 Corinna 1045 280, 292, 293, 310 Lewini 1127 280, 289, 310, 311 Corinna 1125 280, 289, 310, 310 Corinna 1045 Charagia 1127 Charagia <	Ceratodus	356, 979	
Ceratophyllum 69 rufipes 481 Ceratopogon 215, 217, 218, 219, 220, 221, 222, 223, 225, 226, 289, 310, 311 Chalcopterus	~		
Ceratopogon 215, 217, 218, 219, 220, 221, 222, 223, 225, 223, 225, 226, 289, 310, 311 Chalcometa illudens 479 221, 222, 223, 225, 225, 264, 289, 310, 311 Chalcopterus	O 1 1 11	0.0	
221, 222, 223, 225, 226, 289, 310, 311 Chalcopterus	Ceratopogon 215, 217,	218, 219, 220,	01.1
226, 289, 310, 311 Chanapa Angasi 1045 æqualis 292, 294, 310 1044 æratipennis 292, 303, 310 Lewini 1045 albopunctatus, 292, 293, 310 Charagia 1127 arcuatus 306 argyrographa 1132 bipunctatus 221 eximia 1132 decempunctatus 292, 301, ingens 1134 femoratus 221 Lewinii 1129 imperfectus 292, 307, 310 lignivora 1129	221,	222, 223, 225,	
æratipennis 292, 303, 310 Lewini 1045 albopunctatus, 292, 293, 310 Charagia 1127 arcuatus 306 argyrographa 1132 bipunctatus 221 eximia 1132 decempunctatus 292, 301, ingens 1134 femoratus 221 Lamberti 1129 imperfectus 292, 307, 310 lignivora 1129	226,	289, 310, 311	
albopunctatus, 292, 293, 310 Charagia 1127 arcuatus 306 argyrographa 1132 bipunctatus 221 eximia 1132 decempunctatus 292, 301, ingens 1129 femoratus 221 Lewinii 1129 imperfectus 292, 307, 310 lignivora 1129	æqualis	292, 294, 310	Corinna 1044
arcuatus 306 argyrographa 1132 bipunctatus 221 eximia 1132 decempunctatus 292, 301, ingens 1129 femoratus 221 Lewinii 1129 imperfectus 292, 307, 310 lignivora 1129	æratipennis	292, 303, 310	
arcuatus 306 argyrographa 1132 bipunctatus 221 eximia 1132 decempunctatus 292, 301, ingens 1129 femoratus 221 Lewinii 1129 imperfectus 292, 307, 310 lignivora 1129	albopunctatus	, 292, 293, 310	Charagia 1127
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		000	
[310] Lamberti 1129 femoratus 221 Lewinii 1129 imperfectus 292, 307, 310 lignivora 1129	bipunctatus	221	
[310] Lamberti 1129 femoratus 221 Lewinii 1129 imperfectus 292, 307, 310 lignivora 1129	decempunctat	us 292, 301,	ingens 1134
femoratus 221		[310	Lamberti 1129
			T'
insignis 292, 298, 310 Ramsayi 1131	imperfectus		
	insignis	292, 298, 310	Ramsayi 1131

viii. INDEX.

		"	,		
		PAGE	CI.		PAGE
Charagia Scotti		1131			$\frac{242}{200}$
scripta		1132	oresitrophus, 229	24/	, 509
splendens		1130	pervagatus	229	233
Chartacalyx	••	20	plumicornis	• • •	200
Chasmatonotus	•••		plumosus proximus	•••	
Cheilosa	• • •	18	proximus	040	251
Chenesia	••	221	pulcher 229,	240	309
Chersydrus		190	reflectus		
Chilocorus Australasiæ		1275	seorsus 229,	241	309
Baileyi		1275	stercorarius		217
renipustulatus		1275	stigma		
rubidus		1275	subdolus		, 236
tristis		1275	subvittatus		, 246
Chiloglottis Gunnii	• • •		Tepperi 229,	244	309
Chiloscyllium indicum	• • •	183.			, 248
Chiloscyllium indicum modestum	•••	181		•••	
Occitatuiii			Chlænioideus	•••	728
punctatum trispeculare	178	3, 181	Chloanthes parviflora Chloradenia Chloriophyllum Chlorophytum Chonetes	• • •	109
trispeculare	• • •	181	Chloradenia	• • •	18
Chiodecton	•••	103	Chloriophyllum	• • • •	18
Chione roborata	•••	748	Chlorophytum	• • •	22
Chiriphe anguliscripta	•••	1079	Chonetes	• • •	351
dichotoma	•••	1079	Choromeles geographica		1088
dictyota	1079,	1080	strepsimeris	•••	1088
Chiodecton Chione roborata Chiriphe anguliscripta dichotoma dictyota l monogrammaria	• • •	1079	Chrossorhinus	• • •	182
Chirita Chiroleptes australis		21	Chrysanthemum sinense	• • •	98
Chiroleptes australis	• • •	1063	Chrysomela Chrysophyllum	• • •	475
Chironemus marmoratus		1028	Chrysophyllum	• • •	20
Chironomus 215, 216,	217,	218,	Chthonicola sagittata	• • •	409
219, 220,	221,	222,	Cichorium intybus	• • •	98
223, 225,	228,		Cidaria metaxanthata	• • •	1170
alternans	• • •		Cinchloramphus cruralis		410
applicatus		251	rufescens	•••	
australis	•••	254	Cinclosoma punctatum	• • •	
blandus		, 238	Cineraria sinensis	• • •	98
brevis 229	, 249	, 309	Cinnamomum		18
conjunctus conjungens	251	, 253	spurium	2	9, 33
conjungens	• • • •	251	Circe rivularis		748
		, 309	spurium Circe rivularis Circus assimilis	397,	1023
			jarainii		1020
egregius	229	, 232	Cirrhopetalum	•••	62
erebeus 229	, 243	, 309	antenniferum		65
fluviatious			auratum		65
Hexhamensis	229	, 237	blumei	0 0-0	65
imitans		252	candelabrum	•••	65
intertinctus	229	, 234	capitatum	• • •	65
januarius	229	, 239	compressum	• • •	66
januarius Nepeanensis nubifer	229	, 231	cumingii	• • •	66
nubifer	229	, 249	elongatum	•••	66
occidentalis 229	, 230	, 309	maxillare	• • •	66
oceanicus	•••	217	medusæ	• • •	66
opponens		2511	nutans	•••	66
oppositus	251	, 253	pahudii		66

INDEX. ix*

		PAGE			PAGE
Cirrhopetalum stramineur	n	66	Cœlogyne plantaginea		66
thouarsii		66	speciosa		66
vaginatum		66	testacea		66
Cissampelos paraira		57	trinervis		66
Cissus		21	Cœlostegia		19
Citrus decumana		81	Coffee arabica	•••	101
. medicus		82	Colaspidea	•••	462
Cladogynos	***	18	Coleus	•••	100
Cladolipes	•••	887	Collabium nebulosum		67
Cledeobia		1107	Collema		103
Cleidotheca		754	Collyriocincla harmonica		
Cleisocratera		18	Colobochila personalis		1194
Clematis		57	Colocasia antiquorum	•••	102
aristata		1030	macrorrhiza	•••	109
	•••	21		1082,	
01 (•••	474	equidistans		1080
	19, 9		gradata		1081
Clerodendron velutinum		31	irregularis		
	110	, 747			1082
Clibanarius strigimanus Climacteris leucophæa			lunata		1083
	•••	415	obliquata		1082
scandens	•••		sparsana		1081
Clitoria ternatea	•••	97	staurocola		
Clivia nobilis		100	Combretocarpus	•••	24
Clivina Adelaidæ		720	Combretum grandiflorum		98
æqualis 71	18, 720	P 3 P	Comesperma confertum		319
Australasiæ		717	sphærocarpur	n	107
boops		, 721	Commelina Commersonia echinata Conchophyllum	• • •	22
Bovillæ	•••	717	Commersonia echinata Conchophyllum Conognatha navarchis	***	29
debilis	• • •		Conchophyllum	•••	19
dorsalis		719	Conognatha navarchis		1257
	7, 718		Conosia 756	8, 800	, 835
suturalis	•••	719	irrorata 75	8, 837	, 892
tuberculifrons	•••	721	Conospermum flexuosum	318	, 321
vagans	•••	717	taxifolium		109
Wildi		721	Conularia 75	1,752	, 753
Cloniophora		, 863	anomala		-752
Clunio 22	22, 223	, 227	inornata 75	1, 752	, 756
Cnemacanthus		723	plicosa		
Coccobacillus avicidus		583	Convolvulus		19
Coccocarpia	•••	103	Cookia punctata		15
Coccoceras		18	Cookia punctata		83
Cocculus		1064	Copernicia cerifera		52
glaucescens		56	Coprinus		104
indicus		56	Coptodactyla Bayleyi		1251
Cochlospermum	•••	22	glabricollis		1251
Cœliaxis australis		660	Coptophyllum	•••	18
Cœlogyne asperata	•••	66	Corbula Smithiana		748
cinnamonea		66	Corchorus	•••	20
corrugata		66	Corcorax melanorhamphus		412
cumingii		66	Cordia	•••	
longifolia	•••	66		••	300
lowii	•••	66	Cordyline albicans ensifolia Coremia strumosata	•••	
pandurata			Coremia strumosata	•••	1177
panturata	•••	00	Coremia sir amosaia	•••	1111

X. INDEX.

PAGE	PAGE
	Crotalus 915, 968, 971, 972, 976
Coro-para re-emission iii	durissus 936
Corethra 219, 220 Corone australis 412, 557, 560	horridus 927
Corone australis 412, 557, 500	
Correa Baeuerlenii 110, 111, 112	Croton 18, 100
lawrenciana 622	Crunobia 888 Cryptobranchus 962, 979
Corvus australis 412	Cryptobranchus 962, 979
coronoides 560	Cryptodrilus canaliculatus 987,
Corynoneura 222, 223	[995, 996]
Corynophyllus 1253, 1254	fasciatus 988, 990, 992
Corypha 34	mediterreus 987, 995, 996
Cossus argenteus 1135	purpureus 989, 990, 992
labyrinthicus 1135	saccarius 1008
Costus 22, 31, 32	var. montanus 1011, 1013
speciosus 100	var. robustus 996, 1012
Coturnix pectoralis 418	semicinctus 996
Cracticus robustus 404	simulana 000
torquatus 404, 557	
Craspedia glauca 98	Smithi 992 Tryoni 994, 1013
Crassatella castanea 749	unicus 987, 988, 989, 990, 991
Cumingi 748, 749	Cryptomeria japonica 100
decipiens 749	Cryptomeria japonica 100 Cryptostylis erecta 109
2 .	Cryptostylis croota
Kingicola 747, 748, 749,	Ctedonia S38
[750	Ctenophora bella 868
pulchra 749, 750, 1029	vilis 864
Cratogaster 502 Cratomorphus bicolor 647	Cuculus flabelliformis 416
	pallidus 415
Cratoxylon polyanthum 29	Cucumis 20
Creaghia 18 Creochiton 18 Consistence 18	melo 88
Creochiton 18	trigonus 88
	Cudnellia 461
Cricotopus 224	mystica 462
Cricotopus 224 Crinia georgiana 375, 387 signifera 171, 359, 365, 367	Culicoides 219, 221, 290
signifera 171, 359, 365, 367	Cumingia 659
[368, 370, 375]	Cupania fuscidula 33
Crinum 22	Cupressus lignum-vitæ 100
amabile 101	Curcuma 22
asiaticum 72, 101	Cuscuaria 22
	Cuscuta 19
ornatum 101 pedunculatum 101	Cyanotis 22
Crioceris fuscomaculata 460	Cyathea brunonis 75
recens 460	Cyathocrinus 348
Cristiceps australis 1028	Cyathophyllum 348, 351
Crocodilus porosus 131	Cycas circinnalis 52
Crossandra infundibuliformis 99	revoluta 52
	siamensis 40
Crossorhinus 182 barbatus 182, 183, 184	Cyclas 400
dasypogon 178, 184	
dasypogon 170, 104	Cyclopides cynone 524 Cyclopteris cuneata 340
dasypogon 178, 184 stirlingi 178, 179 tentaculatus 178, 182, 183	Cygnus atratus 340
Custs lawis 178, 182, 183	Cygnus atratus 421 Cylindrotoma albitarsis 832
Crotalaria 16 striata 31	0 1 11
striata 31	Cymbella 492

INDEX. xxvii.

	PAG	E			PAGE
Nearcha staurotis	118	53	Noeggerathiopsis spathula	ta.	344
subcelata	1153,114		Nola lugens metallopa Norrisia Notaden bennettii Notidanus Notaden bennettii		1077
Neesia			metallona		1077
Neissa	48		Norrisia		21
inconspicua	455, 48		Notaden hennettii	•••	360
Nelumbium	28, 2		Notidanus	•••	179
speciosum	28, 69, 9		Notidanus 502,	730	1206
Neobrocha phalocyra	107	701			
	128	54	arthuri lateralis variicollis Notophilus Novapus Adelaidæ	•••	1905
Neocavonus Neoheteronyx	128	55	raverans	***	1005
lividus		25	NT-4	720	1290
	128	74	Notophilus	139,	1200
Neorupilia stirlingi	12	14	Novapus	1071	1202
viridis	12	10	Adelaidæ	1251,	1252
Nepenthes	22,	72	Crassus	• • • •	1 -0 -
pervillei		39	laticollis simplex	• • •	1251
Nephelium		20	simplex		1252
lappaceum litchi	9	91	striatopunctulatu	ıs .	1251,
litchi	:	92	striatopunctulatu	[:	1252
Nephrodium (Lastrea) blu	mei '	78	Nyctemera amica		1086
boryanum		78	crescens		1086
calcaratum			cribraria		1086
sericea		77	separata		1086
crassifolium		77	tertiana		1086
crinipes		78	Nycticorax caledonicus		421
dayi		78	Nyctozoilus		1270
eminens		78	Nymphæa	2	9, 69
filix-mas va		,	Nyctozoilus Nymphæa lotus		
elongata		78	pubescens		97
gracilescens		77	stellata		97
,,, ,,		•	Nyroca australis	•••	422
glandulig	rera '	77	Ochrosia elliptica		98
molle		78			
niottleyanum		78	Ochthocharis Ocydromus australis sylvestris	••	557
		78	Ocyuromus austrans	1006	1007
pennigerum			Sylvestris	1290,	1297
sparsa		78	Odezia	•••	1140
syrmaticum		$\frac{78}{70}$	Odantawin minophalla	220	40
unitum		78	Odezia Odina wodier Odontopteris microphylla	336	, 337
Nephrolepis acuminata		78	Oecacia	• • •	440
biserrata		78	Œceoclades		
exaltata		78	falcata Edicnemus grallarius Oenochroma	• • • •	
volubilis		78	Œdichemus grallarius		419
Nerium oleander		98	Oenochroma		1136
Nigasa subpurpurea	12		quaternaria vinaria		1203
Ninguis Ninox boobook	7	92	vinaria		1206
Ninox boobook	399, 4	18	Oenone 1140,	1167,	1194
Nipa fruticans	26, 27,	53	lunaris		1195
Ninox boobook Nipa fruticans Niphobolus	•••	74	lunaris solaris Oiketicus elongatus		1195
acrosticnoides	***	78	Oiketicus elongatus	1052,	1100
adnascens fissum		78	Hübneri Olax stricta Oleandra musæfolia		1100
fissum		78	Olax stricta		109
nummularifoli	um	78	Oleandra musæfolia		78
pennangianum		78	neriiformis		78
stigmosum		78	neriiformis Olearia cassiniæ	319	, 322
87					,
<u> </u>					- >00

xxviii. INDEX.

		PAGE	1	PAG	G E
Olearia ramulosa		322	Oxycanus pardalinus	115	
0 1 1		3.0	rufescens	11	20
	•••	1124	subvarius	115	22
* *** ******		7701		7.4	$\frac{25}{08}$
			Oxylobium cordifolium		
		1124	ellipticum		$\frac{10}{10}$
intricata		1124	Oxyspora		$\frac{18}{2}$
		1199	Ozocera		85
lutosaria		1200	Ozodicera		85
traumata		1200	Pachnephorus		62
Onycodes traumatar	ia	1200	Pachycentria		18
Oopterus		723	Pachycephala gutturalis	40	05
Opegrapha		103	rufiventris	40	06
^ 1 · 1 î		1028	Pachydomus 2	05, 211, 2	12
0 1 1 1		114	globosus		11
salaminia		114	Pachyleptus		23
Ophioglossum pendu		80	Pachynocarpus		$\frac{1}{36}$
	1 /	80	D 'i Ĉ	7	18
O		98	TO 7 . C 4.7		58
	•••		1 1		
cochinillife		87	tomentosa		$\frac{58}{16}$
dillenii	•••	87	Pahudia	0	16
		87	Palæarca subarguta		05
tomentosa		87	Palæoniscus	337, 3	44
Orania macrocladus		54	Palaquium		20
Oreoica cristata		406	Palpomyia 2	19, 221, 2	
Origma rubricata		409	Panagra approximata	12	
Orimarga	758	3, 792	areniferata	11	47
- 1	793	, 795	atrosignata	118	54
australis	793, 795		aurinaria	110	62
		794	aviata	12	
0 1 1 1	•••	453	bijugata	11a	
uniformis		452	buffalaria	118	
0 1	•••	19	carbonata	118	
O 1 1 1		221		119	
	•••	351		119	
0.41	•••			11	
	01 # 00/	351	corrogata		
	215, 224	, 204	costinotata	113	
annuliventr		, 309	curtaria	113	
	255, 258		dentigeraria	11	
numerosus			devitata	11	
pullulus), 309	diffusaria	12	
venustulus	255, 257	7, 309	disputata	117	
Orthomus		732	egenata	114	
berytensis		734	estigmaria	118	38
Orthonyx spaldingi	1050,	1051	explanata	113	79
spinicaudu	ıs	1051	explicataria	114	47
0		707	exsectaria	114	
0.11:.		13, 45	exsignata	11'	
0:-:-		´	extenta	12	
0 1 1	•••	~ ~ ~	ferritinctaria	12	
0		13, 45	fictiliaria	12	
Ottelia alismoides	•••		hypenaria	110	
Oxycanus australis		1121	inconcisata	1147, 114	
fuscomacu		1121	inostentata	12]	
Juscomuca		1120	mostenaud	12	. 7

INDEX. xxix.

	PAGE	1	PAGE
Panagra intercalata	1214	Passiflora filamentosa	88
intermixtaria	1149	fœtida	58
intextata	1147	herbertiana	109
molybdaria	1187, 1190	incarnata	88
nullata	1214	laurifolia	88
. obtusata	1177	lutea "	88
orna a	1189	maliformis	88
perfabricata	1165	pallida	88
perlinearia	1147	quadrangularis	88
petrilineata	1191	serrata	88
plusiata	1192	Pavetta indica	31
promelanaria	1149	Payena	20
reserata	1154	Pecopteris australis	342
reservata	1166	Pecten tenuicollis	203
resignata	1154	Pectunculus Grayanus	748, 750
sigmata	1179	Pedicia	888
sparsularia	1214	Pegasus draco	1028
subcelata	1157	Pelamis bicolor	633
subvelaria	1214	Pelecanus conspicillatus	423
transactaria	1154	Pellacalyx	24
triparata	1190	Pelodryas	371
try.varia	1164	Pentace	20
ursaria	1154	Pentacme siamensis	40
Panax	21	Pentacrinus	630
fruticosum	98	Pentamerus	211
Pancratium biflorum	101	carbonarius	210
malabaricum	101	Pentaneura	219, 223
speciosum	101	Pentaspadon	20
Pandanus	22, 26	Penthoptera	887
Pangium	22	Pentstemon	99
Panicum	101	Peperomia	20
Pannaria	103	leptostachya	108
Papaver horridum	1063	reflexa	108
setigerum	102	Pergularia odoratissima	99
somniferum	102	Perichæta	987
Papilio sylvester	1041	austrina 987,	1000, 1002
tulliolus	1039	canaliculata	987, 1003
Paracroton	18	dorsalis	1015, 1016
Parallelodon subarguta	205	fecunda	1007, 1008
Parartocarpus	18	Hamiltoni	1002
Parascyllium collare	178, 181	Macleayi	1004
nuchale	181	macquariensis	1000
variolatum	181	Stirlingi	1017
Pardalotis ornatus	403	tenax	1014
punctatus	403	terræ-reginæ	1002
striatus	403	Peripatus	598, 632
Parmelia	103	Perissectis	1118, 1119
tinctorum	103	australasiæ	1119
Paropsia edulis	88	Perochirus	1036
Parra gallinacea	421	mestoni	1035
Passiflora	98	Peronema	19
coccinea	88	Persea gratissima	88
edulis	88	Persoonia lanceolata.	109

XXX. INDEX.

	PAGE		PAGE
Persoonia longifolia	319, 321	Phlœocarabus Mastersi	708
revoluta	109	umbratus	709, 710
Petræa volubilis	99	unimaculati	
Petræca Goodenovii	407	Phœnix acaulis	40
	407	Pholidota	62
Leggii	400		
phœnicea		clypeata conchoidea	0.0
Petrochelidon nigricans	400		0.0
Petrophila rigida	318, 321	imbricata	66
sessilis	109	Phora	1100
Phænicospermum	20	Phorticosomus brunneus	722
Phaius	62	felix	722
callosus	67	Nuytsii	723
grandifolius	62, 67	Randalli	722
Phalænopsis	63, 67	Photinus	1297
amabilis	68	Photuris congrua	650
cornucervi	68	Phrataria replicataria transcissata	1161
grandiflora	68	transcissata	1161
lowii	69	Phryniiim	22
luddemanniana	a 69	Phrynosoma Phylacium	632
rosea	67, 69	Phylacium	16
schilleriana	69	Phyllagathis	18
sumatrana	69	Phyllanthera	19
violacea	69	Phyllanthera Phyllanthus	18
TO 11 * 1	139, 1203	emblica•	19 18 29
Phallaria 1 ochripennata	1205	Ferdinandi	131
	1203	superbus	29
ophiusaria	1209	Phylliocephala	1253
subustaria	454	nigro-hirt	a 1254
Phalota obscura	410 FFE	DiII- Jan	113, 116
Phaps chalcoptera Phaseolus Philemon citreogularis corniculatus	418, 557	Phyllodes cerasifera	
Phaseolus	101		113, 116
Philemon citreogularis	414	consobrina	113, 116
corniculatus	414	conspicillator 1	
Philhydrus burrundiensis		Eyndhovii	
melanocephalus		fasciata	116
Philophlœus	713, 715	floralis	116
australis	713	inspicillator	116
eucalypti	712, 713	maligna	116
fuscipennis	714	Meyricki 1	14, 115, 116
immaculatus		ornata roseigera	116
intermedius	712	roseigera	113, 116
obtusus	712	semilinea	116
opaciceps	714	ustulata	116
planus 712	2, 714, 715	Verhuellii	116
puberulus	713	Phyllota barbata	319, 321
quadripennis		phylicoides	321
unicolor	714 715	Dhyllothoon quatrolia 2	34, 337, 339
Phlebopteris	625	Physalis	20
alethopteroide	es 625	Physcia	103
crenifolia	626	Physolesthus australis	1250
polypodioides	625	grandinalni	s 1250
Schouvii	626	Physalis Physoia Physolesthus australis grandipalpi pallidus suturalis Physurus	1250
Phlœocarabus 707	7. 708. 710	suturalis	1250
crudelis	710	Physurus	63, 69
or adolls	,10	, , _ , _ , _ , _ , _ , _ , _ , _ ,	00, 00

INDEX. xxxi.

Physurus pictus		,	PAGE	1.1		PAGE
Phytomyza 1030 irioides 78 Pielus 604, 642, 1118, 1133 longifolium 78 atripalpis 1134 longissimum 78 erythrinus 1134 membranaceum 78 hyalinatus 604, 641, 642, 1133 musefolium 78 hydrographus 1135 membranaceum 78 imperialis 603, 604, 641, 642 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 imperialis 603, 604, 641, 642 plymatodes 78 ingens 1133, 1134 nigrescens 78 ingens 1133, 1134 rupestre 78 ingens 1133, 1134 rupestre 78 ingens 1133, 1134 rupestre 78 labyrinthicus 1135 stenophyllum 78 rileaudis 89, 90 90 Pilea 17 Plettiandra 18 Pilea 20 Plettiandra 18 Pipotopatha	Physums nietus			Pleoneltis incurvatum		
Pielus 604, 642, 1118, 1133 atripalpis longifolium 78 atripalpis 1135 crythrinus 1135 longissimum 78 hyalinatus 604, 641, 642, 1133 linguing membranaceum 78 hydrographus 1135 limperialis 603, 604, 641, 642 linguing 1135 linguing 78 palmatum 78 imperialis 603, 604, 641, 642 linguing 1135 linguing 78 palmatum 78 imperialis 603, 604, 641, 642 linguing plandatum 78 pigalmatum 78 inguing						
atripalpis	Pielus 604, 642.	1118.	1133			
hyalinatus 604, 641, 642, 1133 membranaceum 78 hyalinatus 604, 641, 642, 1133 migrescens 78 hydrographus 1135 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 imperialis 603, 604, 641, 642 phymatodes 78 palmatum 78 palm	atripalnis		1135		•	
hyalinatus 604, 641, 642, 1133			1134			
The state of the						
hydrographus	J					
imperialis 603, 604, 641, 642 floating	hydrographus					78
The color of the				1		78
ingens 1133, 1134 rupestre 78 invarius 1119 stenophyllum 78 dabyrinthicus 1135 stenophyllum 78 maculosus 1121 superficiale 78 Pierardia dulcis 89, 90 Plean 17 Pimelea collina 109 Plethiandra 18 Pimenta acris 86 6 officinalis 86 officinalis 86 86 pleurotomaria 205, 35 Piper 20 Plocoglottis acuminata 67 Pinanga 217 Pistia stratiotes 71 Plumbago capensis 98 Pisania buccinulum 117 pistia stratiotes 71 Plumbago capensis 98 Pisum arvense 101 10 Novæ-Hollandiæ 422, 1026 Plumieria acutifolia 97, 98 Podiceps gularis 422 Pithocoarpa corymbulosa 319, 322 Podiceps gularis 422 Platyleeps Wilkinsonii 336 Podolasia 22	*				•••	78
labyrinthicus	ingens	1133,	1134			78
maculosus	invarius		1119	sinuosum		78
tasmaniæ	labyrinthicus		1135	stenophyllum		78
Pierardia dulcis 89, 90 Plethiandra	maculosus		1121	superficiale	•••	78
Pilea 17 Plettusa 776 Pimenta acris 109 Pleurotomaria 205, 351 Pimenta acris 86 humilis 205 officinalis 86 humilis 205 Pinanga 52, 53 javanica 67 Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Pisania buccinulum 117 rosea 98 Pisania buccinulum 117 plumbago capensis 98 Plistisia stratiotes 711 rosea 98 Plistin stratiotes 711 podiceps qularis 97 ,98 Plithocarpa corymbulosa 319, 322 Podocarpus 34 Podoneura 800 Podoneura 800 Podoneura 800	tasmanice		1134	wrayi		78
Pimelea collina 109 Pleurotomaria 205, 351 Pimenta acris 86 humilis 205 officinalis 86 numilis 205 Pinanga 52, 53 Plocoglottis acuminata 67 Pinanga 90 Plotus Novæ-Hollandiæ 422, 1026 Piptospatha 222 Plotus Novæ-Hollandiæ 422, 1026 Pisania buccinulum 117 rosea 98 Pisania buccinulum 101 rosea 98 Plistia stratiotes 71 Plumbago capensis 98 Plumieria acutifolia 97, 98 Plumbago capensis 98 Plumbago capensis 98 Podargus strigoides 399 Podolosis 92 Pithocophorum undulatum 97, 39	Pierardia dulcis	89	9, 90			
Pimenta acris \$6 humilis 205 officinalis \$6 plocoglottis acuminata 346 Pinanga 52, 53 plocoglottis acuminata 67 Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Piper 20 Plumbago capensis 98 Pisania buccinulum 117 rosea 98 Pistia stratiotes 71 Plumbago capensis 98 Pistia stratiotes 71 Plumbago capensis 98 Platia stratiotes 71 Plumbago capensis 98 Plumieria acutifolia 97, 98 Plumieria acutifolia 97, 98 Plumieria acutifolia 97, 98 Podoragus strigoides 399 Pittosporum undulatum 97, 396 Podolasia 22 Platyceps Wilkinsonii <td></td> <td>•••</td> <td>17</td> <td> Plettusa</td> <td></td> <td>776</td>		•••	17	Plettusa		776
officinalis \$6 ornata 346 Pinanga 52, 53 javanica 67 Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Piptospatha 22 Plumbago capensis 98 Pisania buccinulum 1117 rosea 98 Pistia stratiotes 71 Plumbago capensis 98 Pistia stratiotes 71 Plumbago capensis 98 Pistia stratiotes 71 Plumbago capensis 98 Platia stratiotes 71 Plumbago capensis 98 Platia stratiotes 71 Plumbago capensis 98 Platincarda 101 Novæ-Hollandiæ 97, 98 Podoraryus 20 Podocarpus 34 Platyceps Wilkinsonii 336 <	Pimelea collina		109	Pleurotomaria	205	, 351
vulgaris 86 Plocoglottis acuminata 67 Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Piper 20 Plumbago capensis 98 Pisania buccinulum 117 Plumbago capensis 98 Pisania buccinulum 117 Plumbago capensis 98 Pisania buccinulum 117 Plumbago capensis 98 Pisania stratiotes 711 Plumbago capensis 98 Plumbago capensis 98 Plumbago capensis 98 Plumbago capensis .	Pimenta acris		86	humilis		205
Pinanga 52, 53 javanica 67 Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Piptospatha 22 Plumbago capensis 98 Pistia stratiotes 117 rosea 98 Pistia stratiotes 71 Plumieria acutifolia 98 Pistia stratiotes 101 Novæ-Hollandiæ 99	officinalis		86	ornata		346
Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Piptospatha 22 Plumbago capensis 98 Pisania buccinulum 117 rosea 98 Pistia stratiotes 71 Plumbago capensis 98 Plistia stratiotes 71 Plumieria acutifolia 99, 98 Plumieria acutifolia 99, 98 Podargus strigoides 399 Podocarpus 101 Novæ-Hollandiæ 422 Podocarpus 22 Podocarpus 34 Podocarpus 22 Podonomus 22 Podonomus Platycercus <	vulgaris			Plocoglottis acuminata		67
Piper 20 Plotus Novæ-Hollandiæ 422, 1026 Piptospatha 22 Plumbago capensis 98 Pisania buccinulum 117 rosea 98 Pistia stratiotes 71 Plumbago capensis 98 Plistia stratiotes 71 Plumieria acutifolia 99, 98 Plumieria acutifolia 99, 98 Podargus strigoides 399 Podocarpus 101 Novæ-Hollandiæ 422 Podocarpus 22 Podocarpus 34 Podocarpus 22 Podonomus 22 Podonomus Platycercus <	Pinanga	5	2, 53	javanica		67
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			20	Plotus Novæ-Hollandiæ	422,	1026
ignea	Piptospatha		22	Plumbago capensis		98
Pistia stratiotes 71 Podargus strigoides 399 Pisum arvense 101 101 Podiceps gularis 422 Pithecolobium 16, 29 Podocarpus 34 Pithocarpa corymbulosa 319, 322 Podolasia 22 Pittosporum undulatum 97, 396 Podolasia 22 Plasiantha 24 Podoneura 800 Platycesiantha 24 Podoneura 800 Podoneura 90 Podoneura 800 Podoneura 90 Podoneura 800 Podoneura 920 Podoneura 800 Podoneura 920 Podoneura 920 Podoneura 920 atronitens 728 Podoneura 920 atronitens 728 Podoneura 920 atronitens 728 Podoneura 920 atronitens 728 Podecilus 18 18	Pisania buccinulum		117	rosea		98
Pisum arvense 101 Podiceps gularis 422 pithecolobium 16, 29 Podocarpus 34 pithocarpa corymbulosa 319, 322 Podolasia 22 pittosporum undulatum 97, 396 Podolasia 22 Platuse flavipes 420, 1059 Podonomus 219, 223 Podonomus 20 Podonomus 219, 223 Podonomus 20 Podonomus 219, 223 Podonomus 20 Podonomus 219, 223 Podonomus 219, 223 Podonomus 219, 223 Podonomus 219, 223 atronitens 728, 732 eximius 417 precilus 732 atronitens 732 rinterioris 732 presplendens 728 resplendens 728 resplendens 728 sulcatulu	$ignea \hspace{1cm}$		117	Plumieria acutifolia	9	7, 98
sativum 101 Novæ-Hollandiæ 422 Pithocarpa corymbulosa 319, 322 Podocarpus 34 Pithocarpa corymbulosa 319, 322 Podolasia 22 Pithosporum undulatum 97, 396 Podolaeura 800 Plæsiantha 24 Podoneura 800 Plæsiantha 24 Podonomus 219, 223 Platures 420 atronitens .	Pistia stratiotes		71	Podargus strigoides		399
Pithecolobium 16, 29 Podocarpus 34 Pithocarpa corymbulosa 319, 322 Podolasia 22 Pittosporum undulatum 97, 396 Podonomus 20 Plæsiantha 24 Podonomus 219, 223 Platucesiantha 420, 1059 Podonomus 219, 223 Platyceps Wilkinsonii 336 Chlænioides 728, 732 Platycercus 1025 interioris 732 Platycercus 417 Kingi 728 pennantii 417 Kingi 728 platycerium biforme 73, 79 resplendens 728 Platydactylus 933 semiplicatus 728 platygaster 654 Platynus marginellus 740, 741 gouldiæ 188 Platyplectrum marmoratum 386 Poephila armitiana 188 Platythorax transversicollis 716 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97	Pisum arvense	•••	101	Podiceps gularis		
Pithocarpa corymbulosa 319, 322 Podolasia 22 Pittosporum undulatum 97, 396 Podonomus 800 Plesiantha 24 Platalea flavipes 420, 1059 Podonomus 219, 223 melanorrhyncha 420 melanorrhyncha 420 Platyceps Wilkinsonii 336 Platycercus 1025 eximius 417 pennantii 417 zonarius 1023, 1025 lævis Platycerium biforme 73, 79 resplendens Platydactylus 933 semiplicatus japonicus 939, 962, 980 subviridescens 728 Platygaster 654 Platynus marginellus 740, 741 gouldia murrayensis 741 murrayensis 741 o	sativum				•••	
Pittosporum undulatum 97, 396 Podoneura 800 Plesiantha 24 Plodonomus 219, 223 Platalea flavipes 420, 1059 Pecilus 728, 732 melanorrhyncha 420 Pecilus 732 Platyceps Wilkinsonii 336 chlænioides 728 Platycercus 1025 interioris 732 eximius 417 kingi 732 pennantii 417 Kingi 728 Platycerium biforme 73, 79 resplendens 728 Platydactylus 939, 962, 980 subviridescens 728 Platygaster 654 sulcatulus 728 Platygaster 654 sulcatulus 728 Platyplectrum marmoratum 386 elucotis 188 Platythorax transversicollis 716 pogonanthera 18 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleoplitis accidens 78 regia 97 Polistes 59		16	5, 29		• • •	
Platsiantha					•••	
Platalea flavipes 420, 1059 melanorrhyncha Pœcilus 728, 732 Platyceps Wilkinsonii		97,				
melanorrhyncha 420 atronitens 732 Platycerps Wilkinsonii 336 chlænioides 728 Platycercus 1025 interioris 732 eximius 417 riridescens 731 pennantii 417 Kingi 728 pennantii 73, 79 resplendens 728 Platycerium biforme 73, 79 resplendens 728 Platydactylus 933 semiplicatus 728 platydactylus 933 semiplicatus 728 platygaster 654 Platynus marginellus 740, 741 gouldiæ 188 Platyplectrum marmoratum 386 leucotis 188 Platythorax transversicollis 716 Pogonanthera 18 Pleopeltis accidens 78 regia 97 Polistes 598						
Platyceps Wilkinsonii 336 chlænioides 728 Platycercus 1025 interioris 731 eximius 417 iridescens 731 pennantii 417 Kingi 728 Platycerium biforme 73, 79 resplendens 728 Platydactylus 933 semiplicatus 728 Platygaster 654 subviridescens 732 Platynus marginellus 740, 741 gouldia 788 Platyplectrum marmoratum 386 leucotis 188 Platythorax transversicollis 716 Pogonanthera 188 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopeltis accidens 78 regia 97 Polistes 598		420,			728	
Platycercus 1025 interioris 732 eximius 417 kingi 731 pennantii 417 Kingi 728 zonarius 1023, 1025 lævis 728 Platycerium biforme 73, 79 resplendens 728 Platydactylus 933 semiplicatus 728 platygaster 654 sulcatulus 728 Platynus marginellus 740, 741 poëphila armitiana 188 Platyplectrum marmoratum 386 leucotis 188 Platythorax transversicollis 716 Pogonanthera 18 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopeltis accidens Poinciana pulcherrima		•••				
eximius					• • • •	
pennantii 417 Kingi 728 zonarius 1023, 1025 lævis 728 Platycerium biforme 73, 79 resplendens 728 Platydactylus 933 semiplicatus 728 japonicus 939, 962, 980 subviridescens 732 Platygaster 654 Pletynus marginellus 741 poëphila armitiana 188 Platyplectrum marmoratum 386 leucotis 188 Platythorax transversicollis 716 Pegonanthera 18 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopeltis accidens 78 regia 97 Angustatum 78 Polistes 598		•••				
Zonarius 1023, 1025 levis 728		••			•••	
Platycerium biforme 73, 79 resplendens					•••	
Platydactylus 933 japonicus 939, 962, 980 subviridescens 728 subviridescens 732 subviridescens 188 subviridescens <td></td> <td></td> <td></td> <td></td> <td>•••</td> <td></td>					•••	
japonicus 939, 962, 980 subviridescens 732 Platygaster 654 Platynus marginellus 740, 741 Poëphila armitiana 188 Platyplectrum marmoratum 386 leucotis 1029 Ornatum 386 mirabilis 188 Platythorax transversicollis 716 Pogonanthera 18 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopltis accidens 78 regia 97 angustatum 78 Polistes 598		73			•••	
Platygaster 654 sulcatulus 728 Poephila armitiana 188 Poephil					•••	
Platynus marginellus 740, 741 murrayensis 741 gouldiæ 188 **Platyplectrum marmoratum 386 leucotis 1029 **ornatum 386 mirabilis 188, 1029 Platythorax transversicollis 716 Plectorhyncha lanceolata 413 Pleopeltis accidens 78 **angustatum 78 **Polistes 598		, 962,			•••	
murrayensis 741 gouldiæ 188 Platyplectrum marmoratum ornatum ornatum 386 leucotis 1029 Platythorax transversicollis 716 Pogonanthera 188, 1029 Plectorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopeltis accidens 78 regia 97 angustatum 78 Polistes 598					• • •	
Platyplectrum marmoratum386leucotis1029ornatum386mirabilis188, 1029Platythorax transversicollis716Pogonanthera18Plectorhyncha lanceolata413Poinciana pulcherrima97Pleopeltis accidens78regia97angustatum78Polistes598		740,			•••	
ornatum 386 mirabilis 188, 1029 Platythorax transversicollis 716 Pleetorhyncha lanceolata 413 Pleopeltis accidens 78 angustatum 78 Polistes 598				1 1.	•••	
Platythorax transversicollis 716 Pogonanthera 18 Pleetorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopeltis accidens 78 regia 97 angustatum 78 Polistes 598	01			1 . 1 111		
Pleotorhyncha lanceolata 413 Poinciana pulcherrima 97 Pleopeltis accidens 78 regia 97 angustatum 78 Polistes 598				and the same of th	188,	
Pleopeltis accidens 78 regia 97 angustatum 78 Polistes 598					•••	
angustatum 78 Polistes 598						
		•••		TD 11.4		
nastatum 78 Polyaithia 19		•••	-			
	hastatum	•••	78	roiyaitnia	•••	19

xxxii. INDEX.

		LACIL		LAGE
Polydragma Polygonum fagopyrum		18	Praravinia Prasocuris aucta Praus Prays Premna Prionodura Newtoniana	18
Polygonum		21	Prasocuris aucta	479
fagopyrum		101	Praus	1125
Polymeria calycina Polypodium cornigerum cucullatum		109	Prays	1125
Polypodium	2	8. 74	Premna	19
cornigerum		78	Prionodura Newtoniana	1052
encullatum	•••	78	Prionomyia 219	9, 221, 291
decorum		-	Prionophorus	739
cucullatum decorum (Dictyopteris)	dif-	,0	Pristiophorus cirratus	186
forme		78	nudipinnis	186
fuscatum		78	Problepsis clemens	1093
heracleum	•••	73	sancta	1094
hirtellum	•••	78	Prionotura Newtoniana Prionomyia 219 Prionophorus Pristiophorus cirratus nudipinnis Problepsis clemens sancta Proceduria capensis	630
hirtellum khasyanum	•••	78	Procladius 215, 22	4, 283, 310
laserpitiifoliu		78	naludicola	-284.309
obliquatum		78	pictipennis 28	4, 285, 309
papillosum		78	Procris coronias	1088
(Phegopteris)		,0	pictipennis 28 Procris coronias subdolosa viridipulverulenta	1088
tetum	Punc-	78	viridipulverulenta	1088
tatum subevenosum subfalcatum	•••	78	Productus 203, 21 Abichi brachythærus	1, 345, 347
subfalcatum	•••	78	Abichi	203
		78	brachythærus	203, 344,
tenuisectum triangulare	•••			[348]
			scabriculus	211
Polyporus cinnabarinus	104	, 105	serialis	203
cinnabarinus	•••	105	subquadratus	211
lucidus Pomaderris phylicifolia	***	105	Promecoderus	1289
			Proscenhalium	18
Pomatostomus 4	11, 412	, 414	scabriculus serialis subquadratus Promecoderus Proscephalium Boisduvali harpaloides Reichei Prostanthera saxicola Protium javanicum Protococcus Psamathiomya 21 Psephotus hæmatonotus	727 728
supercilios	us	413	Boisduvali	727
temporalis Porana volubilis Poranthera ericifolia	406	, 412	harnaloides	727
Porana volubilis		99	Reichei	797
Poranthera ericifolia		108	Prostanthera saxicola	109
Porina	1118.	1119	Protium javanicum	94
australis	1120.	1121	Protococcus	491
determinata	1120	1122	Psamathiomya 21	7 222 224
dirempta	1120.	1121	Psenhotus hematonotus	417
fuscomaculata	1120,	1120	Pseudechis 899 901 919	913 916
niphadias	1120.	1122	1926, 931, 93	2 956 959
rufescens	1120.	1122	porphyriacus	894
sphragidias	1120.	1123	Pseudochirus	639
subvaria	1120,	1123	brevicens	1030
Poropterus conifer	1120,	1273	cookii	639
nrodious	•••	1273	lanuginosa	639
Porphyrio melanotus		421	neregrinus	632
Porthesia collucens	•••	1090	Pseudonenhelium	20
Portulaca grandiflora	•••	97	Pseudonhryne	360 370
oleracea		188	australis	359, 360
Potamogeton natans		70	Psamathiomya 21 Psephotus hæmatonotus Pseudechis 899, 901, 912 [926, 931, 93 porphyriacus Pseudochirus breviceps cookii lanuginosa peregrinus Pseudonephelium Pseudophryne australis 364, 368 379, 380 bibronii 173, 174 360, 365 376, 377	3. 376, 377
tenuicaulis	••	70	379 380	381, 389
Pothos		22	hibronii	171, 179
loureiri		59	173 174	177, 359
Poupartia		93	360 365	5. 368 370
Pouzolzia		17	376 377	380, 389
	•••	1,	910, 911	, 500, 505

	PAGE		PAGE
Pseudopus 98	52, 956, 962	Python bivittatus	931, 954, 979
Psidium guayava	86	tigris	007
Psoralea pinnata	319, 321	D	109
T) 1 1 .	219, 223		3.05
	10	Quercus angustata	
Psychotria	430	bancana	
Ptenædus rufescens		brandisiana	41
Pterinea	204, 351	costata	
Pterinea macroptera	204	daphnoidea	106
Pteris aquilina	76	elegans	105
var. esculenta	76	gemelliflora	106
cretica	76	glaberrima	105
incisa	76	induta	105
longifolia	76	pallida	100
ludens	76	placentaria	
marginata	76	platycarpa	
patens	76	pruinosa	
quadriaurita	76	pseudomoluc	
semipinnata	76	* , 7 ,	105
Pterocarpus	16, 34		100
marsupium	1281	sp	100
Pterohelæus raucus	1266	sundaica	
Walkeri	1276	turbinata	
	1114	Ramalina	103
Pterophorus obliteralis	40=	Rana esculenta	362
Pteropodocys phasianella	405	opisthodon	360
Pterostichus aubei	504	temporaria	200 200
azureomargin		Randia	10
civilis	507	densifolia	9.7
holomelanus	730		950
lævigatus	732	Ranhyla aurea	
Pterostylis acuminata	109	Raphistemma	0.0
cucullata	109	Renanthera	
Ptilonorhynchus	396	arachnites	
holoseric	eus 411	coccinea	
violaceu	s 411	(Vanda) lo	
Ptilotis	416	matutina	67
auricomis	413	Rennellia	18
chrysops	413	Retzia	212
fusca	413	Rhabdia	21
1	419	Rhabdomastix	. 758, 828
* *11 /	419		ckeni S29, S91,
	70		[892
Ptychosperma		Rhacophyllum	0.10
singaporen	200	Rhamphidia	MEO MOO
Puffinis brevicaudus	630	communis	
sphenurus	630	fulvithora	
Pultenæa Bänerlenii	110, 111	niveitarsi	
pycnocephala	108		
Punica granatum	87, 98	venusta	
pycnocephala Punica granatum Pycnorhachis	19	Rhaphidophora	
Pyrameis cardui var. Ker	shawi 619	pinnat	
itea	619	Rhina	. 179, 186
Pyrocoelia	646, 647	Rhinacanthus commu	nis 99
bicolor	646, 647	Rhinaria	464
Python 896, 897, 898, 89		Rhinelaps	1028
	27, 932, 938	Rhinobolus	400
[:::, 000, 0	, , , , , , , , , , , , , , , , , , , ,		

xxxiv. INDEX.

DAGE	D. CO.
PAGE	PAGE
Rhinobolus nitidus 464	Saccolabium miniatum 67
Rhinopththalmus marginipen-	pallidum 67
nis 451	Sagus Kœnigii 52
modestus 451	lævis49, 52
nasutus 451, 452	Salpinx viridis 1041
	. 100
Rhipidura albiscapa 406	coccinea 100
Rhizopertha 1261, 1262, 1264	Salvinia 498
Rhizopsyche Swainsoni Rhodamnia trinervia 29, 98, 108	Sanchezia nobilis 99
Rhodamnia trinervia 29, 98, 108	Sandoricum indicum 91
Rhododendron 34	Saphara viridis 1041
	1000 1050
Rhodoleia championi 98	catenulatus 1269
Rhodomyrtus 28	inæqualis 1269
tomentosa 21, 86, 98	lævicollis 1269
Rhus 20	latus 1269
javanica 41	Lindi 1269
Rhynchæa australis 420	1000
Rhynchæa australis 420	01 1 1 1 1000
Rhynchonella pleurodon 212, 351	Odewahni 1269
Rhynchostomis curculionides 457	rudis 1269
Rhypholophus 758, 800, 801	rugosus 1269
(Amphineurus)	Sarcanthus 63
maculosus 802	croceus 68
(Amphineurus)	1 1.0 3.
umbraticus 801, 891	The state of the s
Rhytisternus 730, 739	Sarcocephalus 94
angustulus 730	esculentus 94
Bovilli 728, 729, 730	Sarothrocrepis 711
cyathodera 729	corticalis 712
lævilatera 729	posticalis 712
limbatus 730	- · P17
liopleura 728, 729, 730	Sarotricha demiota 1074
misera 730	punctata 1075
puella 730	undulana 1074
sulcatipes 728, 729	Sarticus 501, 502, 506, 511, 739
Richardia æthiopica 100	
D: 1.1:-	aubei 502, 504, 505 civilis 503, 507, 508
Rondeletia odorata 98	cycloderus 503, 510, 511, 512
Rotala 21	discopunctatus 503, 506
Rourea splendens 31	habitans 503, 507, 508
Rubus Moorei 108	iriditinctus 502, 512
Rudbeckia columnaris 98	ischnus 503, 511
hirta 98	Macleayi 502, 504
1	
Russelia juncea 99	obesulus 503, 507, 508
Saccolabium 63	orbicollis 507
bifidum 67	ovicollis 506
blumei 67	quadrisulcatus 502, 512
compressum 67	Rockhamptonensis 503, 508
densifolium 67	saphyreomarginatus 503,
1	[505, 512]
hendersonianum 67	Satraparchis 1138, 1158
macrostachyum 67	bijugata 1158

INDEX. XXXV.

	3	PAGE	PAGE
Sauloprocta motacilloides		407	Sida 19
Saurauja	•••	21	Sideroxylon 20
Scaeodora omophanes		1079	parvifolium 40
rava		1079	Sigillaria 333
Schima bancana	•••	41	Silene cucubalus 1055
Schizandra marmorata		57	inflata 1055
Schizœa dichotoma	•••	80	0.1
10 11 1		80	Silopa 157 Silphium terebinthaceum 98
digitata malaccana	•••	80	
~ 1	•••	108	The state of the s
Schizomeria ovata	•••		Simmetrodes nitens 1071
Schizophyllum commune	•••	105	Simodontus 724, 725, 726, 731, 732
Schleichera	•••	20	[733, 734, 739
Schoutenia	• • • •	20	æneipennis 733, 734
Scitala		429	(Argutor?) anti-
Scoliacma bicolor		1067	podum 733
cervina		1068	austrālis 734, 736, 737
iridescens		1068	[738
orthotoma		1068	(Harpalus) brun-
Scolyptus		1249	neus 735, 736
abbreviatus	•••	1249	convexus 734
crassicollis		1249	curtulus 735
foveiceps		1249	elongatus 738
	•••	1249	(Harpalus) Fortnumi 734
marginatus	•••	1249	[736, 737
oblongus			c · · · = - = - = - = - = - = - = - = - =
	247,		foveipennis 735
	248,		murrayensis 737
	248,		nitidipennis 735
prominens		1249	occidentalis 734
	248,		oodiformis 735
Scortechinia	• • • •	18	orthomoides 734
Scylliorhinus		179	transfuga 734
analis	178,	180	Simulium 218
buergeri	•••	180	Sindora 16
laticeps		180	siamensis 29
maculatus		180	Sittella chrysoptera 415
Scyllium		179	Slackia 34
Scythrops Novæ-Hollandiæ	•••	416	Sloetia 18
Seisura inquieta		407	Smicrornis brevirostris 407
Semanopterus subæqualis	***	1252	Smilax 22, 59
Somocorpus		20	
Semecarpus	•••	92	
anacardium	•••		Sobas 1270
cassuvium	•••	93	Solandra grandiflora 99
Sericornis		396	Solanum 20
frontalis	395,		ferox 28
gutturalis	•••	1052	jasminoides 99
Serromyia 219	, 221,		pentadactylum 32
Sertularia bidens		633	sanctum 28
Sesamum indicum		102	verbascifolium 28, 1063
Sesia chrysophanes		1067	Sollya heterophylla 319
isozona		1067	Sonerila 18, 30, 44
Setaria		101	Sonneratia 24
isozona Setaria Shorea 29,	33, 36		acida 24, 87
obtusa	•••	40	apelala 24
000000	•••		

xxxvi. INDEX.

DAGE	D. D. C. D. C.
PAGE	PAGE
Sophora tetraptera 1062	Stigmaphyllon ciliatum 97
Sorghum 101	Stigmaria 487
Sorocostia argentea 1076	Straparollus 212
aulacota 1076	Strelitzia angustata 100
cycota 1076	Strepera arguta 403
interspersa 1076	cuneicaudata 403
leucoma 1076	
Sorocostia mesozona 1075	Streptocaulon banmii 58
	graculina 403, 412 Streptocaulon banmii 58 Streptococcus septicus 581 Striga 20 Strix flammea sub- sp. delicatula 399
Spaniotoma 219, 223 Spathoglottis 62	Striga 20
Spathoglottis , 62	Striga 20
aurea 66	Strix flammea sub-sp. delicatula 399
plicata 66	Strobidia 22
tomentosa 66 Spatula rhynchotis 422 Spermacoce 18	Strobilanthes 18
Spatula rhynchotis 422	Strophalosia 351 Strumatophyma 461
Spermacoce 18	Strumatophyma 461
Spermophilus 583	undulatipennis 479
Spermacoce 18 Spermophilus 583 Sphæromias 219, 220, 291	verrucosa 479
albomarginatus 220	Struthidea cinerea 412
Subspecthology 10	Struthidea cinerea 412 Strychnos colubrina 58 nux vomica 40 Stuartina Muelleri 1100
Sphærothalamus 19 Spilanthes grandiflora 15 Spilosoma Brisbanensis 1084, 1085	Strychnos colubrina 55
Spilantnes grandinora 15	nux vomica 40
Spilosoma Brisbanensis 1084, 1085	Stuartina Muelleri 1100
fuscinula 1084, 1085, 1086	Stylidium (Candollog) Jarici.
quinquefascia 1085, 1086	folium 109
Spirifer 351	Styphelia esquamata 109
bisulcatus 348	folium 109 Styphelia esquamata 109 Subulina octona 118 Sumbaria
glaber 348	
Spirifer 351 bisulcatus 348 glaber 348 Spirifera 208, 212, 345, 347	Swintonia 20 Symphyonema paludosum 109 Symplocos pedicellata 31 racemosa 40 Syncarpia laurifolia 108
tasmaniensis 208	Symphyonema paludosum 109
Spiriferina 212	Symplocos pedicellata 31
0.	Symplocos pedicellata 31 racemosa 40
Spirogyra 491	Company of the state of the sta
Spondias dulcis 94	Syncarpia laurifolia 108
Sprengelia 320	Synoicus austrans 415, 557
ponceletia 654	Syntonarcha 1107
~qaaama 110	111astis 1107
vulgaris 186	
Stachytarpheta indica 99	Syzygium jambolanum 86
jamaicensis 99	Tabernæmontana 19
Stelagmites duleis 99 Stelagmites duleis 90 Stegostoma tigrinum 178, 181 Stemodia 20 Stenolophus proximus 1250 Stenopora 207 Stenopora 207	coronaria 98
Stalagmites dulcis 90	Tacca 72 Tachina 1052, 1100
Stegostoma tigrinum 178, 181	Tachina 1052, 1100
Stemodia 20	Tacsonia mollissima 88
Stepolophus provinus 1250	Tacsonia mollissima 88 speciosa 88
Stenopora 207	tripartita 88
Stephania hernandiæfolia 1063, 1064	Teniopteris 340, 343, 355, 634
Stephania nernandiælona 1005, 1004	
Stephanotis 19 floribunda 99	Daintreei 334, 336, 339,
floribunda 99	
Sterculia 19 Sternula sinensis 1296, 1297	Tænitis blechnoides 79 Tagetes 15 erecta 98 patula 98 Tancredia truncata 346
Sternula sinensis 1296, 1297	Tagetes 15
Steropus 501, 505, 506, 507,	erecta 98
Steropus 501, 505, 506, 507, 508, 510, 511, 512	patula 98
Stictonetta nævosa 422	Tancredia truncata 346
Stictoplæa pelor 1041	Tanypus 215, 217, 219, 220, 222
sylvester 1041	[223, 225, 278, 310
	[0,0, -,0, 010

INDEX. XXXVII.

PAGE	PAGE
m 11 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Terillus suturalis 461
": 000	Termessa congrapha 1073
monilis 220 Tanytarsus 215, 224, 267	1079
cereolus 268, 270	1079
communis 268, 271	m · 1. 0
fuscithorax, 268, 272, 309	
inextentus, 268, 269, 309	m . 01
Tanytarsus modieus 268, 274	
montanus 268, 270, 309	
Ogilbyi 268, 273	Tetralopha 18
Taphrosia 825	Tetrapetalum 19
Taraktogenos 22	Tetraphana 778, 780
Tasiocera 758, 815	Tetraphora 219, 223
gracilicornis, 815, 816, 817,	Tetrernia 1109
[892	teminitis 1109
tenuicornis 815, 816, 818,	Teucholabis 758, 798
[891	complexa 799
Taxeotis 1137, 1140, 1214	meridiana 798
anthracopa 1141, 1145	Teulisna dasypyga 1070
delogramma 1141, 1146	Thallarcha aurantiacea 1080
[1148	phaedropa 1080
egenata 1141, 1143, 1148	phalarota 1089
endela 1141, 1142	Theca 753, 754
epigypsa 1141, 1149	lanceolata 751, 753
exsectaria 1141, 1144	operculata 753
intermixtaria 1141, 1149	Thelasis capitata 68
intextata 1141, 1147	carinata 68
isomeris 1140, 1144	Thelotrema 103
isophanes 1141, 1150	Thelymitra venosa 109
oraula 1141, 1143, 1149	Thenarotes 1250
philodora 1140, 1151	Theobroma cacao 101
stereospila 1140, 1142	Theoxena 1139, 1153
Teara argentosa 1089	Thespesia populnea 25
Barnardi 1088	Thinnfeldia odontopteroides 335.336,
protrahens 1090	[337,340
fuiatia 1100	Threskiornis 396
Tanana	strictipennis 420
	Thrixspermum unguiculatum 67
	Thrypticodes xyloglypta 1073
1 1: 00	Thrypticoniyia 758, 774
70	aureipennis 775, 891, 892
	mi + : :
	Thuiaria sinuosa 033 subarticulata 633
Tellinomya 351	2
Telmatogeton 216, 223	alata 27, 99 grandiflora 27, 99
Telopea oreades 110, 112	9
speciosissima 109, 112, 131	
Tephrina aridaria 1155	laurifolia 99
capitata 1152	Tigriodes nana 1069
flavicapitata 1152	pulverulenta 1069
Tephrosia candida 31	spilarcha 1069
Terillus 460, 464	splendens 1068
perplexus 460	transcripta 1069

xxxviii, INDEX.

	3	PAGE		PA	GE
Timoclea gallinula Tinnunculus cenchroides Tinospora crispa Tipula Tomyris 470, 471, 473,		749	Trichomanes digitatum	•••	76
Tinnunculus cenchroides	399.	1024	Javanicum		76
Tinospora crispa	,,,	57	Javanicum maximum neilgheriense pallidum parvulum pluma pyxidiferum rigidum		76
Tinula	•••	220	noilaboriones	•••	70
Tipula	47.4	220	neilgheriense	•••	76
Tomyris 470, 471, 473,	474,	475	pallidum		76
ænea 471, antennata 472,	473,	476	parvulum		76
antennata 472,	473.	476	pluma		76
difficilis	473	477	nyxidiferum		76
difficilis gracilis	468	476	rigidum	•••	7.6
inamunania allia 460	460	476	Twich ontiles nough . J.		110
impressicollis 468,			Trichoptilus pyrrnodes	11	Hã
læta 468, 469,	470,	, 476	Trichosanthes		20
longicornis (?) minor	470,	476	laciniosa		98
(?) minor	475.	477	Trichosaragus	19	269
negligens 466, 467,	472	473	nilosellus	16	771
negingens 100, 107,			Triotone	1110 1	195
1 405 400		[476]	irictena	1110, 1	136
obscura 467, 468,	473,	4/4	labyrinthica	11	135
		[476	Trifolium glomeratum	10)55
(?) paradoxa 473,	475.	477	Trigonia Lamarcki	7	748
pulchella	465	466	Trimiera 758 750	800	320
rasa 465, 466, 467,	160	176	hinting	, 000,	201
1asa 400, 400, 407,	400,	470	mirupes ,	0	221
viridula	468,	409	microcephala	822, 8	523
Torenia	•••	20	sydneyensis	821, 8	322
asiatica		99	Tringa acuminata	4	119
baillonia		99	Triodia irritans	6	339
nolygonoides	•••	99	Triphana 777	770 5	790
viridula Torenia asiatica baillonia polygonoides Tournefortia Toxocarpus Trachymene eriocarpa Trachynotus russelli Tradescantia discolor Tranes internatus Trema amboinense virgata Tremanotus Maideni Trentepohlia 758, albitarsis	•••	9 <i>9</i>	neilgheriense pallidum parvulum pluma pyxidiferum rigidum Trichoptilus pyrrhodes Trichosanthes laciniosa Trichosaragus pilosellus Trictena labyrinthica Trifolium glomeratum Trigonia Lamarcki Trimicra 758, 758 hirtipes microcephala sydneyensis Tringa acuminata Triphana 777 Triphasia trifoliata Tricidia irritans Tricium Triticum Triticum Triticum Triticum Triticum Tritocosmia atricilla Digglesi Triton costatus Triumfetta 758 annulata Trochobola 758 annulata australis 758	, 119, 1	00
Tournetortia		21	Triphasia triionata	•••	84
Toxocarpus	• • •	19	Trisciadia	***	18
Trachymene eriocarpa		319	Tristania	35,	44
Trachynotus russelli		1028	burmanica		41
Tradescantia discolor		100	Triticum	1	01
Transe internatus	•••	384	Tritocosmia atricilla	19	72
The same substitution of the same substitution		204	Tittocosiiia atiiciiia	14	10
Trapa	08	9, 10	Diggiesi	12	13
Trema amboinense	• • •	31	Triton costatus	1	118
virgata		31	Triumfetta		20
Tremanotus		341	Trochobola 758	, 759, 7	83
Maideni		336	annulata	784 7	85
Trantanahlia 759	091	690	annulata australis 78	1 001 0	ดอ
Trentehouna 190,	001,	002	australis 78 cæsarea Tropæolum majus Tropidophorus grayi queenslandi	±,091, 0	92
albitarsis		834	cæsarea	784, 7	85
australasiæ 832	, 833	, 834	Tropæolum majus		88
	[891,	892	Tropidophorus gravi	10	35
exornata	832.	834	queenslandi	æ 10	34
fragillima	832	833	Trypotholium	1	02
nagiiiiia	002,	000	The bearing	••• 1	20
henurhes	002,	000	rypnocaria	4	:OU
tenera	832,	833	hamata	450, 4	51
Trentepohli		834	longipennis	450, 4	51
Tribonyx ventralis		1025	uncinata	4	51
Trichacanthus		18	Turbo Jourdani	1	80
Trichocera	•••	838	nhagianalla	1	90
Triphoglagues	•••	410	T	1	09
exornata fragillima pennipes tenera Trentepohli Tribonyx ventralis Trichacanthus Trichocera Trichoglossus concinnus Novæ-Holland pusillus Trichomanes auriculatum bipunctatum		418	Turnera		13
Novæ-Holland	liæ	418	trioniifiora		98
pusillus		418	Turnix pyrrhothorax	4	18
Trichomanes auriculatum		76	varius	4	18
hipunctatum		76	velox	1	18
		101	VOIOA	1	TO

INDEX. XXXIX.

Turrea			р	AGE			10	AGE
Tydea picta 99 australis 334 Tylophora tenuis 58 Vinca rosea 98 Unio 338, 342 Vinca rosea 18 Unionella 338 Viscum 60 Unona 19 compressum 60 Uracanthus acutus 451 Vitex 19 Urania speciosa 100 Vitex 19 Uropedium lindenii 106 trifoliata 221, 30 Urosthenes 334, 353 elegans 58 uropedium lindenii 106 capriolata 25 Urosthenes 334, 353 elegans 58 uropedium lindenii 106 capriolata 25 Urosthenes 334, 353 garacilis 58 Urosthenes 334, 353 garacilis 58 Uricularia 70, 198 lanceolaria 58 Uricularia 70, 198 lanceolaria 58 vilia 70, 198 viritaina australis 1100	Turræa			1	Vertebraria 334	347, 484		
Tylophora tenuis 58 Vinca rosea 98 Unio Unio 338, 342 Virgularia 118 Unionella 338 Viscum 60 Uperoleia marmorata 171, 174 ramosissimum 60 Uracanthus acutus 451 vitex 19 Uracanthus acutus 451 vitex 19 Uracanthus acutus 451 vitex 19 Uropedium lindenii 106 vitex 19 Uropedium lindenii 106 vitex 29 Urosthenes 334, 353 capriolata 58 Usnea 103 capriolata 58 Usnea 103 lokokeri 58 bifida 70 198 lanceolaria 58 bifida 70 198 lanceolaria 58 vulgaris 70 198 vitrina 388 Varia 19, 31 vittaria 28, 74 Vallaisneria 633, 659 falcata 79				99				
Union Unionella 338, 342 Virgularia 118 Uniona 19 compressum 60 Urona 171, 174 ramosissimum 60 Uracanthus acutus 451 virex 19 Urania speciosa 100 vitex 19 Uropedium lindenii 106 virex 29 Urosthenes 334, 353 capriolata 29 Urosthenes 334, 353 capriolata 58 Usnea 103 hokeri 58 Usnea 103 hokeri 58 Uricularia 70, 198 lanceolaria 58 bifida 70 reticulata 70 reticulata 70 reticulata 70 resiculata 70 reticulata 70 reticulata 70 vulgaris 193 vitrina 388 retiriolia 58 Vallota purpurea 100 vitra 100 vitra 79 Vallota purpurea 67				58				
Unionella 338 Viscum 60 Unona 19 compressum 60 Uperoleia marmorata 171, 174 vicanthus acutus 451 Urania speciosa 100 vitex 19 Urolitha bipunctifera 604 vitex 19 Uropedium lindenii 106 capriolata 25 Urosthenes 334, 353 gracilis 58 Usnea 103 hookeri 58 Uricularia 70, 198 lanceolaria 58 bifida 70, 198 lanceolaria 58 bifida 70 stellaris 70 trifolia 58 vulgaris 197 virira 28 trifolia 58 vulgaris 193 Vittria 38 vitrifolia 58 vulain 193 Vitria 28,74 vitriolia 28,74 Uvaria 193 Vitria 29,74 vitriolia 58 valian 627 Vit	TT '		338,	342		•••		118
Unona 19 compressum 60 Uprenoleia marmorata 171, 174 vitex 19 Uracanthus acuttus 451 vitex 19 Urania speciosa 100 vitex 19 Uropedium lindenii 106 vitis 21, 30 Urosthenes 334, 353 elegans 58 australis 334 53 gracilis 58 bifida 70 perticulata 70 perticulata 70 bifida 70 perticulata 70 perticulata 58 bifida 70 perticulata 70 perticulata 58 bifida 70 perticulata 70 perticulata 58 vulgaris 193 vitrina 388 semisagittifolia 58 vulgaris 193 vittadia 287,4 vitrina 388 Vallota purpurea 100 vitrina 28,1 vitrina 10 Vanila 67 <					T7.			
Upercoleia marmorata 171, 174 ramosissimum 60 Uracanthus acutus 451 Vitex 19 Urania speciosa 100 trifoliata 29 Uropedium lindenii 106 trifoliata 29 Uropedium lindenii 106 capriolata 58 Uropedium lindenii 106 capriolata 58 Usnea 103 capriolata 58 Usnea 103 hookeri 58 Uricularia 70, 198 lanceolaria 58 bifida 70 reticulata 70 reticulata 70 reticulata 70 reticulata 70 reticulata 58 vulgaris 193 Vitrina 388 Vuraria 19, 31 Vittaria 28, 74 Uvaria 19, 31 Vittaria 28, 74 Vallota purpurea 100 Vallota purpurea 100 vallota purpurea 100 Vandelia 67 delogana 79 </td <td>Unona</td> <td></td> <td></td> <td>19</td> <td></td> <td></td> <td></td> <td>60</td>	Unona			19				60
Urania speciosa 100 Vitex 19 Urania speciosa 100 Vitis 21, 30 Uropedium lindenii 106 Vitis 21, 30 Urosthenes 334, 353 australis 58 Usnea 103 hookeri 58 Utricularia 70, 198 lanceolaria 58 Utricularia 70 exoleta 70 exoleta 70 emisagittifolia 58 Utricularia 70 emisagittifolia 58 Utricularia 70 emisagittifolia 58 Utricularia 70 emisagittifolia 58 Vallaria 70 trifolia 58 Vuria 70 trifolia 58 Vuria 193 Vitrina 388 Vitraia 193 Vitriai 28,74 Vallosaria 633,659 falcata 79 Vallota purpurea 100 scolopendria 79 Vallota purpurea 67 <td>Uperoleia marmorata</td> <td></td> <td>171,</td> <td>174</td> <td>ramosissimi</td> <td>ım</td> <td></td> <td>60</td>	Uperoleia marmorata		171,	174	ramosissimi	ım		60
Urolitha bipunctifera Uropedium lindenii	Uracanthus acutus			451	Vitex	• • •		19
Uropedium lindenii	Urania speciosa			100	trifoliata			29
Urosthenes	Urolitha bipunctifera			604	Vitis		21	, 30
Usnea	Uropedium lindenii			106	capriolata	•••		58
Usnea	Urosthenes		334,	353	elegans			58
Utricularia	australis			334	gracilis			58
bifida 70 exoleta 70 reticulata 70 stellaris 70, 198 vulgaris 197 Uvaria 193 Vallisneria 633, 659 spiralis 71 Vallota purpurea 100 Vanda 62 batemanni 67 fuscovioides 67 gigantea 67 helvola 67 helvola 67 helvola 67 lamellosa 67 limbata 67 limbata 67 limbata 67 limbata 67 limbata 67 vilnignis 67 vinsignis 67 limbata 67 limbata 67 limbata 67 vindellia 20 Vandellia 20 Vanila 56, 63 Variegata 860 Vateria 39, 42 Vatica 29, 33, 34, 36 Varegata 860 Vateria 39, 42 Vatica 29, 33, 34, 36 Vernonia 174 lamellaris 748 vernicella annulata 389 Vernonia 15 acuminata 41 cinerea 15 Acuminata 197 Vittaria 28, 74 Vittadinia australis 1100 Vittaria 28, 74 Vittadinia australis 1100 Vittaria 28, 74 Vittadinia australis 1100 Vittaria 28, 74 Voluta fusiformis 118 magnifica 319 Volvoxineæ 500 Walsura villosa 40 Willughbeia 19 Wittaria 29, 87 Voluta fusiformis 118 magnifica 313 Volvoxineæ 500 Wendlandia tinctoria 40 Willughbeia 19 Willughbeia 19 Wormia 21 Wormia 21 Wormia 21 Wormia 21 Wormia 21 Wormia 21 Wanthophæa 707, 708 Xanthophæa 707, 708 Xanthophæa 707, 708 Xanthophæa 620 Correæ 621 Var. fulva 620 Var. ful	Usnea			103	hookeri			58
exoleta	Utricularia		70,	198	lanceolaria	•••		58
reticulata	bifida			70	semisagittifol	ia		58
stellaris 70, 198 Vittadinia australis	exoleta			70	trifolia			58
Stellaris 70, 198 Vittadinia australis 1100 Vitaria 28, 74	reticulata			70	Vitrina			388
Uvaria 19, 31 elongata 79 Vallisneria 633, 659 falcata 79 spiralis 71 lineata 79 Vallota purpurea 100 scolopendrina 79 Vanda 62 sulcata 79 batemanni 67 Voluta fusiformis 118 fuscovicides 67 Woluta fusiformis 118 gigantea 67 Voluta fusiformis 118 helvola 67 Woltus fusiformis 118 helvola 67 Wolvoxinee 500 helvola 67 Walsura villosa 40 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Willughbeia 19 suavis 67 flavescens 58 tricolor 67 flavescens 58 violacea 67 Wormia 21 Vaniella 20 Wormia 313 Variegata	stellaris		70,	198	Vittadinia australis	3		1100
Vallisneria 633, 659 falcata 79 spiralis 71 lineata 79 Vallota purpurea 100 scolopendrina 79 Vanda 62 sulcata 79 batemanni 67 sulcata 79 fuscovioides 67 sulcata 79 hookeri 67 Wolvata fusiformis 118 hookeri 67 Walsura villosa 40 hookeri 67 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Wendlandia tinctoria 98 Wendlandia tinctoria 40 Willughbeia 19 deulis 98 martabanica 58 flavescens 58 martabanica 58 Wornila 20 Wormia 21 Vanilla 56, 63 Worlegata 860 Worljata pungens 103 Vatria 39, 42 Wrightia coccinea	vulgaris				Vittaria		28	3, 74
spiralis 71 lineata 79 Valda 62 sulcata 79 batemanni 67 sulcata 79 fuscovicides 67 Voluta fusiformis 118 magnifica 313 118 magnifica 313 Volvoxinee 500 walsura villosa 40 walsura villosa 40 <t< td=""><td>Uvaria</td><td></td><td>19</td><td>9, 31</td><td>elongata</td><td></td><td></td><td>79</td></t<>	Uvaria		19	9, 31	elongata			79
spiralis 71 lineata 79 Vallota purpurea 100 scolopendrina 79 Vanda 62 sulcata 79 batemanni 67 voluta fusiformis 118 fuscovicides 67 magnifica 313 gigantea 67 Volvoxinee 500 helvola 67 Walsura villosa 40 hookeri 67 Walsura villosa 40 limbata 67 Willughbeia 19 lissochilus 67 flavescens 58 suavis 67 flavescens 58 violacea 67 Woollsia pungens 109 Vanilla 20 Wormia 21 Variegata 860 Wrightia coccinea 98 Vatrica 29, 33, 34, 36 Vernicala 21 Venus gallinula 749 Variea 621 Vermicella annulata 389 Vermicella annulata 389 Vernoria 15	Vallisneria		633,	659	falcata			79
Vanda 62 sulcata 79 batemanni 67 Voluta fusiformis 118 fuscovioides 67 Voluta fusiformis 313 gigantea 67 Volvoxinee 500 helvola 67 Walsura villosa 40 hookeri 67 Wendlandia tinctoria 40 helvola 67 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Wendlandia tinctoria 40 Wellughbeia 19 Wellus 98 firma 58 firma 58 for Wistaria 113 Woollsia pungens 109 Wormia 20 Wormia 21 Variegata 868 Wanth	spiralis			71	lineata			79
batemanni	Vallota purpurea			100	scolopendi	rina		79
fuscovicides 67 magnifica 313 gigantea 67 Volvoxinee 500 helvola 67 Walsura villosa 40 hookeri 67 Walsura villosa 40 insignis 67 Wendlandia tinctoria 40 Willughbeia 19 edulis 98 limbata 67 firma 58 lissochilus 67 flavescens 58 suavis 67 flavescens 58 violacea 67 Woollsia pungens 109 Vanilla 20 Wormia 21 Vanilla 56, 63 Wrightia coccinea 98 Vateria 39, 42 Wrightia coccinea 493 Vatica 29, 33, 34, 36 var. fulva 621 Venus gallinula 748 Klugii 620 roborata 748 Klugii 620 vermicella annulata 389 Vermonia 1137, 1138, 1198 Vernonia <t< td=""><td>Vanda</td><td></td><td></td><td>62</td><td>sulcata</td><td></td><td></td><td>79</td></t<>	Vanda			62	sulcata			79
gigantea	batemanni			67	Voluta fusiformis			118
Nelvola	fuscovioides			67	magnifica			313
hookeri .67 Wendlandia tinctoria .40 insignis .67 Willughbeia .19 lamellosa .67 edulis .98 limbata .67 firma .58 lissochilus .67 flavescens .58 suavis .67 flavescens .58 violacea .67 Woollsia pungens .109 Vandellia .20 Wormia .21 Vanilla .56, 63 Wrightia coccinea .98 Variegata .860 Xanthophæa .707, 708 Vateria .36 Xanthophæa .707, 708 Vatica .29, 33, 34, 36 Xanthophæa .620 Venus gallinula .749 var. fulva .621 Vermicella annulata .389 Klugii .620 Vermoria .15 Xenomusa 1137, 1138, 1198 Vernoria .41 monoda .1198 Veronica salicifolia .1062 Xerophila leucopsis .409 <td>gigantea</td> <td></td> <td></td> <td>67</td> <td>Volvoxineæ</td> <td></td> <td></td> <td>500</td>	gigantea			67	Volvoxineæ			500
insignis .67 Willughbeia .19 lamellosa .67 edulis .98 limbata .67 firma .58 lissochilus .67 ffavescens .58 suavis .67 wartabanica .58 violacea .67 Woollsia pungens .109 Vanilla .56, 63 Wormia .21 Vanilla .56, 63 Wrightia coccinea .98 Vatrica .860 Kanthophea .707, 708 Vatria .98 Xanthophea .707, 708 Xanthophea .707, 708 Xanthophea .620 Vatica .29, 33, 34, 36 var. fulva .621 Venus gallinula .748 Klugii .620 roborata .748 Iathoniella .620, 621, 622 Vermicella annulata .389 Xenomusa 1137, 1138, 1198 Veronica salicifolia .1062 Xerophila leucopsis .409 Veronica salicifolia .1062 Xerospermum noron	helvola			67				40
insignis .67 Willughbeia .19 lamellosa .67 edulis .98 limbata .67 firma .58 lissochilus .67 ffavescens .58 suavis .67 wartabanica .58 violacea .67 Woollsia pungens .109 Vanilla .56, 63 Wormia .21 Vanilla .56, 63 Wrightia coccinea .98 Vatrica .860 Kanthophea .707, 708 Vatria .98 Xanthophea .707, 708 Xanthophea .707, 708 Xanthophea .620 Vatica .29, 33, 34, 36 var. fulva .621 Venus gallinula .748 Klugii .620 roborata .748 Iathoniella .620, 621, 622 Vermicella annulata .389 Xenomusa 1137, 1138, 1198 Veronica salicifolia .1062 Xerophila leucopsis .409 Veronica salicifolia .1062 Xerospermum noron	hookeri			67	Wendlandia tinctor	ria		40
lamellosa 67 edulis 98 limbata 67 firma 58 lissochilus 67 flavescens 58 suavis 67 tricolor 67 flavescens 58 tricolor 67 Wistaria 1131 martabanica 58 Vanilla 20 Woollsia pungens 109 20 Wormia 21 Wrightia coccinea 98 Variegata 860 Xanthophæa 707, 708 Xanthophæa 707, 708 Xanthophæa 620 493 Vatria 39, 42 Xanthosia rotundifolia 319 correæ 621 Venus gallinula 749 Klugii 620 621 Vermicella annulata 389 Vermonia 15 Klugii 620 621 620 622 Vernonia 15 Acmomusa 1137, 1138, 1198 1198 620 622 622 622 622 622 622 622 623 623 623 <td>insignis</td> <td></td> <td></td> <td>67</td> <td>Willughbeia</td> <td></td> <td></td> <td>19</td>	insignis			67	Willughbeia			19
lissochilus				67	edulis			98
suavis .67 martabanica .58 tricolor .67 Wistaria					firma			58
tricolor violacea 67 Vandellia 20 Vanilla 56, 63 Variegata 860 gynoplistioides 868 Vateria 36 indica 39, 42 Vatica 29, 33, 34, 36 Venus gallinula 749 lamellaris 748 Vermicella annulata 748 Vermicella annulata 389 Vernonia 15 acuminata 41 cinerea 15 Veronica salicifolia 1062 Veropica salicifolia 1062 Veropica 677 Woollsia pungens 109 Wormia 21 Wormia 21 Wormia 21 Wormia 21 Wormia 21 Wormia 21 Xanthophæa 707, 708 Xanthophæa 493 Xanthoriheea 493 Vanica achanta 620 var. fulva 621 Vur. fulva 621 Iathoniella 620, 621, 622 Vernomia 1131 Verophila leucopsis 409 Verophila leucopsis 409 Verophila leucopsis 409 Verophila leucopsis 409					flavesc	ens		58
violacea 67 Woollsia pungens 109 Vandellia 20 Wormia 21 Vanilla 56, 63 Wrightia coccinea 98 Variegata 860 Wrightia coccinea 98 Vateria 36 Xanthophæa 707, 708 Vatica 29, 33, 34, 36 Xanthorrhœa 493 Venus gallinula 749 var. fulva 620 Iamellaris 748 Klugii 620 Vermicella annulata 389 Iathoniella 620, 621, 622 Vernonia 15 Xenomusa 1137, 1138, 1198 Veronica salicifolia 1062 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91						oanica		58
Vandellia 20 Wormia 21 Vanilla 56, 63 Wrightia coccinea 98 Variegata 868 Xanthophæa 707, 708 Vateria 36 Xanthorphæa 493 Vatica 29, 33, 34, 36 Xanthosia rotundifolia 319 Venus gallinula 749 var. fulva 620 lamellaris 748 Klugii 620 vermicella annulata 389 Lathoniella 620, 621, 622 vernonia 15 Xenomusa 1137, 1138, 1198 Veronica salicifolia 1062 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91								1131
Vanilla 56, 63 Wrightia coccinea 98 Variegata 860 Xanthophea 707, 708 Synoplistioides 868 Xanthophea 707, 708 Vateria 36 Xanthosia rotundifolia 319 Vatica 29, 33, 34, 36 Venus gallinula 749 Vamica achanta 621 Venus gallinula 748 Klugii 621 roborata 748 Klugii 620 Vermicella annulata 389 Iathoniella 620, 621, 622 Vernonia 15 Xenomusa 1137, 1138, 1198 Acinerea 15 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91								109
Variegata .								21
gynoplistioides 868 Xanthorrheea 493 Vateria 36 Xanthosia rotundifolia 319 Vatica 29, 33, 34, 36 correæ 620 Venus gallinula 749 var. fulva 621 lamellaris 748 Klugii 620 vernicella annulata 389 Vernonia 620 621 622 Vernonia 15 Xenomusa 1137, 1138, 1198 1198 Veronica salicifolia 1062 Xerospermum noronhianum 91	Vanilla		50			***		98
Vateria							707,	708
indica 39, 42 Xenica achanta 620 Vatica 29, 33, 34, 36 correæ 621 Venus gallinula 749 var. fulva 621 lamellaris 748 Klugii 620, 621, 622 Vermicella annulata 389 lathoniella 620, 621, 622 Vernonia 15 Xenomusa 1137, 1138, 1198 acuminata 41 monoda 1198 cinerea 15 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91		les					•••	
Vatica 29, 33, 34, 36 correæ 621 Venus gallinula 749 var. fulva 621 lamellaris 748 Klugii 620 roborata 748 lathoniella 620, 621, 622 Vermicella annulata 389 vernoina 620, 622, 622 Vernonia 15 xenomusa 1137, 1138, 1198 acuminata 41 monoda 1198 veronica salicifolia 1062 xerospermum noronhianum 91						olia		319
Venus gallinula					Xenica achanta	•••	•••	
Iamellaris 748 Klugii 620 roborata 748 lathoniella 620, 621, 622 Vermicella annulata 15 Xenomusa 1137, 1138, 1198 Vernonia 19 <td></td> <td>. 29,</td> <td>33, 34</td> <td></td> <td></td> <td></td> <td>•••</td> <td>621</td>		. 29,	33, 34				•••	621
roborata 748 lathoniella 620, 621, 622 Vermicella annulata 389 Vernonia 15						• • •		
Vermicella annulata 389 orichora 620, 622 Vernonia 15 Xenomusa 1137, 1138, 1198 acuminata 41 monoda 1198 cinerea 15 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91			•••					
Vernonia 15 Xenomusa 1137, 1138, 1198 acuminata cinerea 41 monoda 1198 Veronica salicifolia 15 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91			• • •			620		
acuminata cinerea 41 monoda 1198 Veronica salicifolia 1062 Xerospermum noronhianum 91								
cinerea 15 Xerophila leucopsis 409 Veronica salicifolia 1062 Xerospermum noronhianum 91			•••			1137,		
Veronica salicifolia 1062 Xerospermum noronhianum 91			•••				•••	
TT			•••					
Verrucaria 103 Xerotes flexifolia 109			•••			nhianui		
	Verrucaria	•	•••	103	Aerotes flexifolia	•••	•••	109

				PAGE			PAGE
Xylocarpus	granatu	ım		25	Zaphrentis		212
Xylopertha				1262	Zea mays		101
			1264,	1266	Zelotypia Stacyi		1133
	vidua				Zephyranthes rosea		100
Xylopia					Zeritis discifera		622
Xylosma		•••		22	Zia tactalis		1073
Xylostroma		eum		612	Zingiber		22
Yucca aloit		•••	•••		Zinnia elegans	•••	98
brev	ifolia			100	multiflora		98
glau	cescens			100	Zippelia		20
Zalacca edu				30	Zizyphus		21
Zamensis o		us	•••	927	jujuba	•••	40, 87
77 •	•••		•••	384	Zopherosis Georgii	•••	120
Zamites					Zosterops cærulesce		415





	P	AGE			PAGE
Cymbidium aloifolium		66	Dalbergia		-16
atropurpureum	• • •	66	11 1		40
brevilabre		66	pongamia .		26
pubescens		67	D 1		18
sanguineum	• • •	67	T)		33
Cymindis inquinata		710	TO 1 1 1	119	, 120
Cynoglossum		21			1044
Cyphosoma		502	7 7 1		1039
unicolor		502	1 * 7 *		119
Cypræa coffea	659,	660	sylvestris .		1041
Irvineanæ	633,	659	tulliolus .		1039
stolida var. breviden	tata	660	Daphniphyllum .		34
Thatcheri		187	Daption capensis .		
thersites		187	Darantasia		1151
venusta		187	flavicapit		1152
vitellus		189	$mundiar{f}ero$	ıria	1152
	31, 63	64	Dasycoleum .		13
barbatum		69	To 1		99
caudatum		106	Davallia angustata .		76
concolor		69	9 31 1		76
glanduliferum		64			76
haynaldianum		64	divaricata .		=0
hirtissimum		69	elegans .		F 0
hookeri		69	(Prosaptia)		
lævigatum		64			
lawrencianum		69	griffithiana		E 0
lowii		l, 69	(Humata) h		
parishii		64	hymenophy		
philippinense	•••	64	moluccana		
platytænium	=	$6\overline{4}$	1		m c
purpuratum	• • • •	69			70
roebelenii	•••	64	(Microlepia	ninnata	
sanderianum		106	(Leucostegi		
stonei		4, 69			
Cypselus pacificus	•••		,	•••	E.0
	•••	20	(Stenoloma)		
glabra		99	The second second		001
Cyrtanthera pohliana	•••	99	divaricata		9, 321
Cyrtina carbonaria			squarrosa		
var. Australasica	210		70 7 0 1		- 20
			Deiopeia pulchella .	• • • • • • • • • • • • • • • • • • • •	1086
carbonarius Cyrtodeira fulgida Cyrtostachys rendah	•••		Delima sarmentosa	••	31, 57
Cyrtostachya randah	…	8, 55			
Cystignathus Sydneyensis,	2	171	acerosu		~ .
Cythonog mutile	•••	749	acicular		0.4
Cytherea rutila Daboia 912, 913, 916.	021			e atissimum	64
			aduncu		0.4
935, 937,			affine		0.4
955, 956	, 957,	999			
Russelli (?) Dacelo cervina	1002	1004	amboin	guineum	0.1
Dacelo cervina	557	1024	anosmu		
gigas 397, 401,	557,	1002	anosmu		2
leachii	•••	1024			
Dahlia excelsa	•••	98	calcara	tum	64
86					

xii. INDEX.

			PAGE	D 1 13 1461	PAGE
Dendrobium		•••	64	Dendrochilum latifolium	65
	crumenatum	•••	64	longifolium	
	cucumerinum	•••	64	Dendrocygna vagans	422
	cumulatum	•••	64	Dendrolagus Lumholtzi	1052
	cymbidioides	•••	64	Dentalium	351
	dayanum	•••	64	Deragena Boisduvalli	1046
	discolor	• • •	64	Derris	16, 31, 57
	erosum	•••	64	scandens	57
	excavatum	• • •	64	uliginosa	57
	flavescens		64	Desmodium	16
	gemellum		64	Deurodon	928
	giganteum	• • •	65	scaber	927
	glaucophyllum	• • •	64	Dialycarpa	19
	glumaceum	• • •	64	Diamesa	223
	hasseltii		64	Diamuna gastropacharia	1205
	hymenophyllur	n	64	Dianella cærulea	100
	junceum		64	ensifolia	31, 100
	kuhlii		64	Diaphanes	646
	latifolium		65	Diaphanops	457
	longicolle		64	Meyricki	458, 459
	lowii .		65	paralellus	459
	macranthum		65	Westermann	i 457, 458,
	macrochilum		65		[459
	macrophyllum		65	Diaphonia adusta	129
	miserum		65	dorsalis	128
	mutabile	•••	65	maura	130
	nudum		65	olliffiana	127
	pallidum	•••	65	rugosa	129, 130
	pictum		65	Dicæum hirundinaceum	415
	planibulbe		65	Dichelaspis orthogonia	118
	plicatile		65	Dichodium	103
	revolutum		65	Dichoma	18
	rhombeum	•••	65	Dichopsis	38
	rigidum		65	Dichromodes 1137, 1138	
	ruckeri		65		, 1167, 1195
	rugosum		65	ainaria	1167, 1170
	salaccense		65	anelictis	1168, 1172
	scopa		65	atrosignata	1170, 1184
	secundum	•••	65	compsotis	1168, 1174
	taurinum		65	confluaria	1169, 119;
	teres		65	consignata 1169	
	teretifolium	•••	109	diasemaria	1168, 1171
	undulatum		65	disputata	1168, 1173
	vaginatum		65	divergentaria	1170
	veitchianum	•••	65	estigmaria	1169, 1188
	violæodorum	•••	64	euscia	1170, 118
	zollingerianum		65		9, 1179, 1180
	var. albur		65	explanata	1170, 1178
Dendrocalin			40	indicataria	1170, 1180
Dendrochilu			62	ioneura	1168, 1189
Dendrochill	abbreviatum	••	65	ischnota	1169, 1189
	filiforme		65	12	1169, 1178
	glumaceum		65	molybdaria	1169, 118
	Samuel		00	111013 0001100	

INDEX. xiii.

PAGE	PAGE
Dichromodes obtusata 1169, 1177	Diphasia subcarinata 633
odontias 1168, 1173	Diphyllodes Gulielmi iii 1052
ophiuca 1169, 1186	Diphyphyllum 212
orectis 1169, 1183	C.T. T. T. T.
1180 1100	
orthotis 1169, 1180	pallidum 77
paractata 1168, 1176	polypodioides 77
partitaria 1168, 1175	porrectum 77
personalis 1169, 1194	sorzogonense 77
poecilotis 1168, 1181	speciosum 77
sigmata 1169, 1179	subserratum 77
steropias 1167, 1182	sylvaticum 77
stilbiata 1170, 1192	tomentosum 77
triparata 1170, 1190	Diplodiscus 13
Dicksonia ampla 75	Diplogenea 44
barometz 75	Diplogenea
Dicranomyia 758, 759, 760, 776,	Diplopseustis 1107
	Dipteris bifurcatum 78
ennulines 760 779	
annulipes 760, 773 auripennis 760, 769 cuneata 772, 891 dorsalis 767 halterata 773 Helmsi 760, 763	horsfieldii 78
auripennis 760, 769	Dipterocarpus 33, 35, 36, 38, 40,
cuneata 772, 891	[41, 42, 105
dorsalis 767	costatus 41
halterata 773	lævis 37
Helmsi 760, 763	obtusifolius 41
incisuralis 760, 770	trinervis 38
longipennis 762, 773	tuberculatus 40, 41 turbinatus 37, 38
marina 760, 765, 891, 892	turbinatus 37, 38
obscura 764	Dischidia 19
obscura 764 obscuripennis 760, 768	Thecohola 783
punctipennis 760, 761, 765,	Disenalum 19
[891	Dissochata 18
remota 760, 761, 766, 891	Dodonesa angustifolia 1132
saxatilis 760, 762, 891	multijuga 108
saxaums 700, 702, 691	Dolishon gois 101
viridiventris 772	Delegious soja 101
saxatilis 760, 762, 891 viridiventris 772 zonata 760, 770, 771 Didiscus albiflorus 108	Disepalum 19
Didiscus albiflorus 108 Didymocarpus 21	monucota 200, aos
Didymocarpus 21	Donacicola castaneothorax 411
Didymochlæna lunulata 77	pectoralis 1029
Didymochlena lunulata 77 polycarpa 21 Didymophleps 224 Diemenia superciliose 894 913 916	Doona
Didymophleps 224	Doricha pelor 1041
Diemenia superciliosa 894, 913, 916,	sytvester 1041
926, 931, 932, 938, 945,	Doryanthes excelsa 000
946, 947, 1052, 1100	palmerii 110
Digama marmorea 1086	Doryphora sassafras 107
Digaster 999	palmerii 110 Doryphora sassafras 107 Dracena 22, 100 angustifolia 31
	angustifolia 31
	Dracontomelon mangiferum 93
Dione rutila 749	Dracophyllum secundum 109
Dione rutila 749	
Dioscorea 22 Diospyros 21	- I
Diospyros 21	Driessenia 18
burmanica 40	Drimostoma 723, 724
Cargillia , 109	alpestris 723
Cargillia 109 fruticosus 29, 33	australis 723
kaki 95	montana 723

xiv. INDEX.

	PAGE				PAGE
Drimostoma tasmanica	723	Epacris Calvertian	a		109
Thouzeti 72		crassifolia		•••	109
vicina 72		impressa	•••		110
Drimys aromatica	110	Epharpastis	•••		1114
Dromaius Novæ-Hollandia		Ephthianura albifr			409
	[1029	Epidesmia 1139	, 1140,	1153,	1158,
Dromius crudelis	710			ĺ	1159
tridens	710	chilonari	ia	1160,	1162
Drosera	198	hypenari	ia 1160,		
Dryandra	322	oxyderce	es	1160,	
Drymoglossum piloselloide	es 74, 79	perfabrio	cata	1160,	1165
Drynaria heracleum	79	replicata	ria	1160,	1161
linnæi	79	reservata	a	1160,	1166
rigidalum	79	transciss	ata	1160,	1161
Dryobalanops	36, 42	tricolor	•••		1160
aromatica	38, 105	tryxaria	•••	1160,	
Duboisia myoporoides	. 604	Epilectus	•••		1289
Dupinia	21	Epiprinus		• • •	18
Duranta plumieri	97, 99	Epizeuxis lyterioid	es	•••	384
Durio	19	Eranthemum	•••		8, 99
Dyera	19	Erebia	•••	• • •	
Dysoxylum spectabile	1062	Eremia	•••	•••	1139
Ebenus	33	Eria	•••	•••	62
Eburopetalum	19	armeniaca	•••	•••	66
Echinorhinus spinosus	178, 185	bractescens	• • •	•••	66
Echites sp	98	cochleata	•••	•••	66
Eclipsiodes marmaropa	1111	convalarioides		•••	66
Ectroma	710, 711 1270	denticulata	•••	•••	66
Ectyche	1270	dillwynii	•••	•••	66
Edmondia	205	flava	•••	•••	66 66
Edusia	474, 477	fusco-viride	•••	•••	66
Edusoides	477	leucostachys	•••	•••	66
pulcher	477	mucronata multiflora	•••	•••	66
Ehretia		nutans	•••	•••	66
Elæocarpus Elanus axillaris	20, 29, 31 398, 1024	obesa	•••	•••	66
	7.00	ovata	•••	•••	66
Elatostemma reticulata	-00	pannea	***	•••	66
Elephantomyia	3.00	polyura	•••		66
Elephantopus scaber Elhamma determinata	1122	stellata	•••		66
inconclusa	1119	velutina	•••		66
subvaria	1123	vestita			66
Ellipeia	19	Eriocera			887
Emblica macrocarpa	40	Eriodendron			33
officinalis	40, 90	Erioptera 758,	816, 81	8, 819,	820
Endococcus	103	ochracea		•••	819
Engelhardtia villosa	41	Eriostemon Coxii			111
Enhalis kœnigii	70	Erycibe	•••	•••	19
Enicosanthemum	19	Erythrina ovalifolia		•••	26
Entada scandens	30, 57	Erythrogonys cinct			419
Entomyza cyanotis	414	Estrilda Bichenovii		•••	410
Eopsaltria australis	408	castanotis			411
Epacris	320	guttata			411

		PAGE				PAGE
Estrilda	modesta	411	Eucalyptus sideroxy	71on 41-	1,418,	1277
	temporalis	411	Sieberia	na 60	6, 607	, 618
Lubolia	indicataria	1186	stellulat	a 606,	618,	12/8
	linda	1184	stricta	•••	606	1001
	partitaria	1175	teretico: triantha	rnis	•••	1021
Sucalyr	otus 163, 605,		triantna			606
		1258, 1263	virgata	60	b, 607	100
	acmenioides	606	Eucharis amazonica Euchromia irus	•••	•••	1000
	albens	607	Euchromia irus	•••	•••	1000
	amygdalina 6		DOLVINEL	lati		1000
		10, 611, 612 607	Eugeissona triste	•••	 59	106
	bicolor	0001	Eugenia	19 90	າດ ວ	2 44
	capitellata	03.0	Eugenia	10, 20,	04, 0	40
	coriacea corymbosa	1053, 1054,	jambolana Eulebia	•••	•••	711
	corymbosa	[1100, 1282]	T3 1 1 *	•••	•••	62
	crebra 1277,	1278 1281	Eulophia macrostac	hva		67
	Clebia 1211,	[1287]	squalida			67
	eugenioides 60		T3 1 "		1139,	
	ficeilie	609 611	Eumelea rosalia	•••		1197
	fissilis gigantea	615	Euomphalus	•••	•••	351
	globulus 396	1021 1281	Fuonymus			34
	gomphocepha		Eupatorium glandu Euphema pulchella	losum		98
	goniocalyx 19	0. 633. 1021	Euphema pulchella			417
	hæmastoma l	90. 606. 614	Euphemus Orbignii			206
	hemiphloia 41		Urei			206
	largiflorens		Euphorbia		•••	18
	leucoxylon	1277, 1278,	Drummo		•••	389
		[1281, 1287]	(Poinset			
	macrorrhyncl	na 606, 614		a		100
	Maideni	1020	splender			100
	Maideni marginata	318, 320	Euphrostis collucens			1090
	melliodora	1021	Euplœa		1037,	
	microcorys	606, 607	amycus		1038,	
	obliqua 6	06, 613, 615	Angasii			1044
	paniculata	1277, 1278,	Arisbe			1059
	[1281, 1282,	1286, 1287	boisduvalii		1038,	1046
	pauciflora	606, 616	boreas		1038,	
	pilularis 6	06, 610, 616	climena	•••	1040,	
	piperita 31	12, 606, 612,	corinna	1038,	1044,	
	[6	13, 616, 617	Crithon		1038,	
	punctata	1278, 1284	Darchia	•••	1037,	
	radiata	609 606, 612	Dardanus	•••	1038,	
	regnans	606, 612	Eichorni			1046
	resinifera	1277, 1278,	eleusina	•••		1046
	[1280, 1283]	, 1285, 1287	eleutho			1046
	robusta 611,	1277, 1278,	eschscholtz			1046
		[1284, 1287	Euclus		1038,	
			Hippias	••	1037,	
	saligna 190,	1277, 1278,	hyems	•••		1039
	[1281,	1284, 1287	Lewinii	•••		1045
	siderophloia		Melpomene			1041
	[1280, 1281, 1283	5, 1285, 1287	Misenus	***	1037,	1038

xvi. INDEX.

		1	
77 1 1110	PAGE		PAGE
Euplœa monilifera niveata	1038, 1043	Feronia (Steropus)_Bl	
niveata	1037, 1039	,, Bon	vouloiri 506
pelor	1041	,, civil	is 507
priapus	1039	,, cya	neotincta 505
sylvester 1037, 1041			odera 510, 511
	, 1039, 1045	1:00	opunctata 506
viridis	1037, 1041	,, aisc	antala 511
viridis	207, 1041	,, eteg	antula 511
Eupodotis australis	395, 419		eraldipennis 507
Eurostopodus guttatus	399		mari 506
Eurycles amboinensis	72	,, inec	lita 733
australis	101	,, irid	itincta 512
cunninghamii	101	(Sarticus) isch	$na \dots 511$
Eurycnemus	224		
Euryscaphus titanus	1288	(Steropus) Ma	stersi 510
Waterbane:	1000		$ula \dots 507$
Waterhousii	1290 401, 412		
Eurystomus pacificus			vier i 507
Eusideroxylon	18		khampton-
Euthria cornea	117	er	sis 508
lignaria	117		iyreomar-
lignaria Eutoma loddonense	446		inata 505, 506
loddonense	1289		hyripennis 507
(Canonym) symp	115		
(Carenum) sump			termouser 510
Evactinopora	207, 208	restuca Hookerlana	110
crucialis	207	ribraurea tinctoria	57
dendroidea		Ficus	. 16, 29
Evia acida	93		17
Evodia roxburghiana	29	Filetia Fittonia argyroneura	18
Evolvulus	19	Fittonia argyroneura	99
Evolvulus Excæcaria	18	Flacourtia sapida	40
	0-	Flomingia	40
agallocha		Flemingia	16
Excalfatoria australis	419	Flindersia maculosa	1049
Exocarpus	415	Forcipomyia	. 219, 221, 289
Exotrocha liboria	1067	Forcipomyia Fordonia	190
Fagopyrum	21	Fourcroya gigantea	100
Fagopyrum Fagræa auriculata	21, 58	Franklandia fucifolia	
auriculata	33, 58	Fraus	1125
	29, 33		7720
77 7	1059		
Falco hypoleucus	398	T7	
lunulatus	398	Freycinetia	
melanogenys	398	Fritzschia	
Falcunculus frontatus	406	Fulica australis	421, 1025
Farfugium grande	98	Fusus corneus	117
Fasciolaria lignaria	118	lignarius	11~
tarentina	118	Gaillardia	1 =
T) 1	304	1 . 1	00
Favorites	0 = 1	01.	000
Favosites	351		
Feronia elephantum	83	Gallinago australis	
Feronia 5	11, 512, 738	Gallinula tenebrosa	
australis	733, 734	Gammatoba monilifere	<i>a</i> 1043
(Pterostichus) az	ureo-	Gamogyne Gangamopteris	22
marginata	506	Gangamopteris	334, 342, 343,
barbara	733	3 1	[344
	100		LOTI

PAGE	PAGI
Gangamopteris angustifolia 334	Glyphodes luciferalis 1106
Garcinia 21, 33, 90, 97	microta 1108
dulcis 90	Gnophomyia 758, 759, 800, 823
Gardenia 18 98	microta 1108 Gnophomyia 758, 759, 800, 823 [825, 826] cordialis 759, 806
campanulata 31	cordialis 759 82
obtusifolia 40	fascipennis, 824, 825, 893
obtustiona 40	Cotton Contains, 624, 629, 691
obtusifolia 40 turgida 40 Gastrophora 1139, 1201, 1202	
Gastrophora 1139, 1201, 1202	Gompholobium glabratum 103
henricaria 1202	Goniatites 35.
henricaria 1202 Geniostoma 21 ligustrifolium 1062	Goniatites 35 Goniomyia 82 Goniophlebium korthalsii 78
ligustrifolium 1062	Goniophlebium korthalsii 78
Geobasileus 416 chrysorrhœa 409	subauriculatum 78
chrysorrhœa 409	verrucosum 7
reguloides 409	Gonomyia 758, 825, 826, 83
reguloides 409 Geopelia cuneata 418 tranquilla 418	leucophœa 820
tranquilla 419	Conveners
O	Conductor masses
Geranomyia 198, 199, 119, 110, 111	Goodyera procera
annulata 777, 780, 892	rubicunda b
fusca 777, 778, 780, 892	Gordius 658
lutulenta 777, 779, 892	Gordonia 2
pieta 777, 778, 892	Gossypium 19
unicolor 776	herbaceum 101, 105
Gerbera 15	indicum 109
Geronticus spinicallis 396 420	Graculus melanoleucus 422, 1026
Gerveene albiquierie 407	stictocenhalus 429 1020
Company cinnahavina	Crolling piects 40
Geshera chinabarma 99	Chamma tanhana 201 00
oxoniensis 99	leucophœa
refulgens 99	Grammatophyllum fastuosum 63
zebrina 99	multiflorum 68
Geunsia 19	scriptum 6
Gilibertia 21	speciosum 6
Ginalloa 60	tigrinum 6
Ginglymostoma concolor 178, 180	Grangea 1
Girella tricuspidata 313	Graphis 8
Gironniera 38	Grantophyllum hortense 9
goltidifolia 31	Gratiola 20
Claichania dicarna yan amlaaniaa 75	Granolus melanons 405 55'
Gierchema dicarpa var. vulcanica 75	Chandles Brownii 210, 33
dienotoma 28, 75	Grangea
flagellaris 28, 75	Macræana 11
norrisii 75	Miqueliana 10
sp 337	Renwickeana 11
Globba 22	Grewia 20
Glochina 781	oppositifolia 8
Glossonteris, 334, 335, 337, 339, 341,	Grewia 20
342 343 344 345 346	Grus australasianus 396, 42
2.17 248 254 255 484	Guioa 2
100 404 400	O-H-
Browniana 338	Gymnema syringifolium 5
linearis 344	Gymnogramme (Stegnogramme)
moribunda 344	alismæfolia 7
Gloxinia 99	aspidioides 7
Glyphis 103	feei 7
Browniana 338	fraxinea 7

xviii. INDEX.

Gymnogramme hamiltoniana 79 involuta 79	PAGE
Gymnogramme namiltoniana 19	Haliætus leucogaster 1024
involuta 79	Haliastur sphenurus 398, 1024
	Halicornaria iurcata 055
wallichii 79 Gymnorhina tibicen 404, 557 Gynochthodes 18 Gynoplistes 860 Gynoplistia 758, 838, 860, 864,	Halirytus 217, 222, 224
Gymnorhina tibicen 404, 557	Haloragis disticha 31
Gynochthodes 18	monosperma 110, 112
Gynoplistes 860	
Gynoplistia 758, 838, 860, 864,	Haltica 464 Haplaner 1250
[880, 886]	Harnalus brunneus 733 734
annulata 758, 863, 880,	Devrollei 733
[892]	Deyrollei 733 Fortnumi 733, 734 Hatteria 356 Hectobrocha multilinea 1072
apicalis 882, 883, 885	Hatteria 356
bella 861, 862, 863,	Hectobrocks multilines 1079
868, 872, 882,	pentacyma 1072
891, 892	TT4 Subligia 10/2
bimaculata 862, 875, 877,	Subnigra 1072 Hectomanes 1118, 1125 noserodes 1125, 1126 polyspila 1125, 1127 simulans 1125, 1126
[878, 892	noserodes 1125, 1126
chalybeia 884, 892 constans 758	polyspila 1125, 1127
constans 758 cyanea 862, 866, 867,	simulans 1125, 1126
cyanea 862, 866, 867,	Hederopsis 21
[868, 881, 882, 891	Hedychium 22
elegans 868	Hedyotis 18
flavipennis 862, 863, 877,	Hederopsis 21 Hedychium 22 Hedyotis 18 Helæus consularis 1268
[892]	elongatus 1267 moniliferus 1268
flavitarsis 864	moniliferus 1268
fumipennis 884	pallidus 1267, 1268
	nringong 1969
fusca 838 Howensis 872, 892 jucunda 861, 863 Macquarti 881, 885	Helianthus annuus 98 tuberosus 98 Helichrysum 98 Heliconia bicolor 100 sanguinea 100 Helicteres 19 Helionorus albonunctatus 172 360.
iucunda 861, 863	tuberosus 98
Macquarti 881, 885	Helichrysum 98
melanopyga 862, 874, 892	Heliconia bicolor 100
nervosa 864 885	sanguinea 100
nervosa \$64, \$85 obscurivena \$67, \$91 punctipennis \$75	Helictores 10
nunctinannic 875	Holioporus albonunatatus 172 260
variegata 861, 868, 882	172, 300,
vilis 861, 862, 863, 864,	Helietronium
71115 001, 002, 003, 004,	Helioporus albopunctatus 172, 360, [376, 386] Heliotropium 21 peruvianum 99
[867, 885, 891	Helius 788
viridis 862, 878, 880, 892	Helius 788
Viridis 602, 576, 850, 892 viridithorax 882, 892 Westwoodi 871, 891 Gynotroches 24 Gypsochroa 1140 Gyrostomum 103 Habrothamnus newellii 99 Hæmodorum planifolium 109 teretifolium 109	Helminthostachys zeylanica 80
Westwood 3/1, 391	Hemagaima chiionaria 1162
Gynotroches 24	Hemagalma chilonaria 1162 inspersa 1163 Heosphora 1115 chlorogramma 1116 virginella 1115
Gypsochroa 1140	Heosphora 1115
Gyrostomum 103	chlorogramma 1116
Habrothamnus newellii 99	virginella 1115
Hæmodorum planifolium 109	Hepialus 1118, 1127, 1128
teretifolium 109	argyrographus 1128, 1132
Hakea 1207	Hepialus
Macræana 110, 111, 112	eximius 1120, 1132
Halcyon Macleayi 402 pyrrhopygius 401, 1025 Haldemania 659	hyalinatus 1134
Halcyon Macleayi 402	Lewinii 1128, 1129
pyrrhopygius 401	lignivora 1129
sanctus 401, 1025	lignivorus 1128, 1129
Haldemania 659	Ramsayi 1128, 1129, 1131

H : 1 C		AGE	PAGE
Hepialus Scotti l	128, 1	131	Heteronyx brevicoilis 1219
scriptus 1128, 1			Heteronyx brevicollis 1219 brevicornis 141, 148 castaneus 668
TT	.128, 1 219,	000	castaneus 668 collaris 667, 701, 703, 704
Heptagyia Heptanchus indicus Heptapleurum Heritiera littoralis Herodias alba Herpestis Hesperilla cynone monticolæ munionga	210,	170	contains 007, 701, 703, 704
indiane	***	179	concolor 138, 664, 682 constans 143, 154, 163
Hantanlaurum	•••	21	corpulentus 1225
Haritiara littoralis	•••	25	crassus 144, 161, 162, 163,
Herodias alba	•••	421	[164, 165, 1243]
Hernestis		20	cygneus 143, 159, 160
Hesperilla cynone		624	Darlingensis 1225
monticolæ		624	Darwini 426, 435, 437
munionga ornata Hestiochora xanthocoma		623	debilis 140, 144, 149, 169,
ornata		624	Γ170
Hestiochora xanthocoma	1	088	deceptor 1227
Heterallactis euchrysa	I	0711	dentipes 144, 168, 169, 170
Heterodontus galeatus		185	dimidiatus 662, 668, 669,
Heterodontus galeatus phillipi Heteromyia Heteromyias cinereifrons	184,	185	[673, 1244]
Heteromyia	219,	223	diversiceps 1232, 1234, 1236
Heteromyias cinereifrons	1	050	[1237]
Heteronympha amnis 1	000, 1	000	doctus 665, 692, 698
Banksii	1	000	dubius 143, 157, 1241 electus 143, 160
cordace			electus 143, 160
merope	•••	622	elongatus 666, 687, 688, 690
philerope		622	[694]
Heteronyx 137, 138, 139,	140, 1	57,	excisus 1232, 1239, 1240
425, 426, 429,			fallax 662, 672 fissiceps 1232, 1238
1217, 1221, 15			fissiceps 1232, 1238
1228, 1243, 12			flavus 667, 696, 699, 700, 705
	100	256	fortis 429 fraternus 662, 673 Froggatti 1225, 1227 frontalis 1222
acutifrons	428,	220	Francis 002, 073
advena l	221, 1		froggatti 1225, 1227
æqualiceps 1	232, 1		fulvohirtus 141, 148, 162
equaliceps 1 equalis 1 agrestis 665, 688,	224, 1		[163, 1221
anceps 144, 163	164	165	fumatus 127 1244
angustus	667	600	fumatus 137, 1244 glabratus 137, 1244
aphodioides 427	430	674	gracilipes 152, 153, 154, 155,
aridus	427.	432	156, 159, 166, 670,
aridus aspericollis 427	430.	431	1225, 1226, 1229
Augustæ 138, 144	. 159.	162	granulifer 141, 146, 148,
[164, 165,	441, 1	243	1 1234
aureopubescens		691	granum 1231, 1235
auricomus 143,	158, 1	160,	hepaticus 1244
,	[161,	684	granum 1231, 1235 hepaticus 1244 hirtuosus 662, 671, 1223
australis l	1243, 1	244	holomelænus 1218, 1243,
badius l	221, 1	222	1245
Beltanæ l	224, 1	225	holosericeus 1224, 1225
bidentatus 427	, 434,	694	horridus 142, 665, 666, 1225
borealis 428			incola 426, 436
Bovilli 1220, 15			incultus 427, 430, 431
		236	infuscatus 138, 1217
breviceps	1	225	insignis 145

XX. INDEX.

Heteronyx pubescens 138, 696, 1217
[1225, 1226]
puncticollis 664, 684
punctipennis 142, 143, 149,
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
154, 674, 678
pustulosus 666, 674, 685, 688
1689 690 692 694 699
nygidialis 1233
ovedraticallic 1939 1937
Randalli 1995 1996
pygidialis 1233 quadraticollis 1232, 1237 Randalli 1225, 1226 rapax 664, 679 raucinasus 142, 152, 154
manainagua 149 150 151
rhinastus 665, 666, 688, 689
5000 1015
[690, 1245
Kotnel 004, 053
rotundiceps 1223
Rothei 664, 683 rotundiceps 1223 rotundifrons 428, 443 rubescens 1231 rubriceps 1218, 1246 ruficollis 138, 1217 rufo-marginatus 704, 1218 [1246]
rubescens 1231
rubriceps 1218, 1246
ruficollis 138, 1217
rufo-marginatus 704, 1218
[1246]
rufopiceus 1219
rugosipennis 1225
satelles 1224, 1225
scutatus 667
scutatus 667 setifer 1232, 1233, 1234 simius 663, 675
simius 663, 675
simulator 1232
Sloanei 144, 164, 1243
solidas 1994 1995
spadicea 138 1993
sparsus 428, 440, 677
spretus 1223
striatipennis 662, 671, 1244
subferrugineus 666, 691, 694
subfuscus 428, 439, 440
submetallicus 429, 1241
subvittatus 138, 1217 tempestivus 1230, 1235
tempestivus 1230, 1235
testaceus 149, 167, 169, 440
testaceus 149, 167, 169, 440 [1225] torvus 1228, 1240 transversicollis 138, 1217
torvus 1228, 1240
transversicollis 138, 1217 unguiculatus 1218, 1223
unguiculatus 1218, 1223
unicolor 137, 1243, 1244
vacuus 663, 674, 676, 677
vacuus 663, 674, 676, 677 [678, 698

INDEX. XXI.

PAGE	PAGE
Heteronyx vagans 668, 694, 696	Hydrusa cyanura 1087
variegatus 1225	ecliptis 1087
viator 1228	eschatias 1088
Victoris 1225, 1229	hesperitis 1088
Heterophthalmus 312	hyalota 1087
Hexacentris mysorensis 59	intensa 1088
Hexagona 104	leucacma 1087
Hexatheca 21	macroplaca 1088
Hibbertia saligna 107	nesothetis 1088
Hibiscus 19	paraula 1087
Hibiscus 19 rosa-sinensis 96, 97	phepsalotis 1088
tiliacens 25	pyrocoma 1088
Hieracidea orientalis 399, 1024	pyrrhodera 1087
Hinulia 894, 916, 962, 1028	stelotis 1087
Hippuris 69, 70	synedra 1088
Hirneola auris-judæ 104	
polytricha 104	Hyla 371 aurea 357, 359, 365, 367,
Hirundo frontalis 400	368, 369, 370, 371,
neoxena 400	372, 382, 384, 385
Hockeria 1100	cærulea 365, 368, 369, 370,
Holocanthus tibicen 1028	[371, 381, 385, 1063
Homolepida casuarinæ 1028	citropus 171, 173, 359, 365,
Hoomonema fluitans 492	[368, 371, 383
Hopea 29, 33, 36, 42	dentata 360, 383
Hoplocephalus 1028	dentata 360, 383 dimolops 386
frontalis 1027	ewingii var. calliscelis 359, 364,
ornatus 1028	[367, 368, 370, 382, 383, 387
Hoya 19	962 971 902 906
FO 00	rreycinet 369, 371, 353, 359 krefftii 367, 383, 384 latopalmata 360, 371, 383 lesueurii 360, 371, 373, 385 peronii 365, 370, 381 phyllophop 174, 176, 250, 287
	letonalmete 360 371 385
la currona 50	lesueurii 360 371 373 385
pratense 58	neronii 365 370 381
pratense	phyllochroa 174, 176, 359, 367,
Humea 322 Hydractinia lævispina 118 Hydrangea japonica 98 Hydreuretis sacadalis 1110 Hydrilla verticillata 71	[368, 371, 382, 383
Hydrangas ianonica 08	verrequivii 387
Hydrangea japonica 98 Hydreuretis sacadalis 1110	Hylacola pyrrhopygia 408
Hydrilla verticillata 71	Hylella bicolor 360 386
Hydrilla verticillata 71 Hydrobænus 223	Hylochelidon nigricans 400
- 1 11 1 D 1111 B40	Hylodes martinicensis 360
	verreauxii 387 Hylacola pyrrhopygia 408 Hylella bicolor 360, 386 Hylochelidon nigricans 400 Hylodes martinicensis 360 Hymenophyllum aculeatum 76
	javanicum 76
Hydrocampa sacadalis 1110	var. badium 76
sacadusalis 1110	neesii 76
	polyanthos var.
Hydrosaurus 933, 935, 939, 941, 942,	blumeanum 76
951, 952, 954, 956, 957,	amithii 76
959, 962, 964, 967, 969	Hyrolithes 753 754 755 756
varius 894 Hydrusa anepsia 1087	smithii 76 Hyolithes 753, 754, 755, 756 lanceolatus 751, 753, 754,
	[755, 756]
1000	Hyperolia marmorata 171, 174, 359,
annulata 1088	[368, 369, 376]
antitheta 1087, 1088	Hunnum 1051
aperta 1088	Hypnum 1051 Hypocalymma 320
bicolor 1088	Hypocalymma 320

xxii. INDEX.

	PAGI	.1	PAGE
Hypocalymma stricti		The second secon	95
Hypochroma acanthi			215, 224, 279
	romaria 1098		
maculat			
Turneri			280
viridica			18
Hypographa	1136, 1139, 1210	Ixonanthes icosandr	
atmoscia			18, 27, 31
hiracopis			98
hypotaer	<i>iiaria</i> 1209	coccinea	98
phlegeto	maria 1211, 121:	rosea	98
privata.	1209	Jackia	18
	ria 1211, 121:	2 Jacksonia horrida	319, 321
Hypotaenidia Philipp	pensis 42	scoparia	321
Hypotia	1108	T	319, 321
Hypoxis	25		cea 99
Hypsa australis .	1080		86
basilissa .	1080	aquæa	86
Caricæ .	1080		86
chloropyga .	1086	6 vulgaris	86
dama .	1086	Jasminum	20, 98
nesophora .	1086	Jatropha curcas	100,102
	1086	multifida	100
	623	3 Juanulloa mexicana	99
Ibis falcinellus .	420, 1059	Juneus vaginatus	110
Icerya Purchasi 123	3, 124, 125, 126	Junonia vellida	620
	[1052	Jussiena repens	69
Ichnocarpus frutescer	ns 58	Justicia	18
Ichthyosaurus .	345	coccinea	99
Idioptera	781	Kaulfussia æsculifol	ia 80
Iguana tuberculata .	962	Kibessia	18
Ilex	34	Kingstonia	19
Illæna	455	Knorria imbricata	339
exilis ,	455, 456	Kopsia fruticosa	98
inconspicua .	455, 456	Kunzea	1204
Meyricki	455, 457	capitata	108
Imantophyllum minis	atum 100	Labidomyia	219, 221, 289
Imperata arundinacea			1289
Indigofera	16, 31	Lacerta agilis	916
Inga dulcis	98	Lachnoderma	711
Inocarpus edulis .	88	Lagenaria vulgaris	58
Iodis Illidgei .	603	Lagenoplastes ariel	400
iosticta .	1094	Lagerstræmia	21
leucomerata .	603, 604		nda 98
	1094		
	19, 99		
	103		
	59		450
- O	59	cyanea	450
	59		450
Isis	633		449
	186		450
Isonandra .	33, 95	Lahia	19

			PAGE	1			AGE
Lalage tricolor			405	Lestophonus	1	23, 124,	126
Lambertia formosa			109	icery	$^{\prime}$ æ 1	23, 124,	125
Lampides agricola	**:		623	mone	phlebi	•••	125
alsulus			622	Leto		1118, 1	132
Lampyris		646	, 647	Stacyi		1	133
bicolor			, 647	Lettsomia .			19
Lansium domesticu			91	Leucania aureola	•••	1	097
Lantana		19, 3	2, 99	fumata		1	.098
camera	•••	2	8, 32	Leucomeris	•••		15
Lanx	***		659	Leuconotus			19
Larus Novæ-Hollan	diæ		422	Leucopogon		34, 44,	320
pacificus			422	altern	ifolius		
Laschia	•••		104		xicaulis		320
Lasioptera vastatri:			190	Leucosarcia picata		418.	
Lathamus discolor		•••	418	Libnotes		758,	
Laurelia			1060	strigivens	758. 7		
Novæ-Zeal	andiæ		1060	Licuala			, 53
Lavoisiera	WILLE		44	acutifida	•••	0.1	54
Lawsonia inermis	•••		98	longipes		•••	53
T 1:	•••		711	peltata	•••	53,	
benefica	• • •	•••	711	Lilium longiflorum			100
civica	•••	•••	711	washington	ı nianım		100
Lecananthus	•••	•••	18	Limnobia 758,	750 79	81, 782, 7	
Lecanomerus	•••	•••	1250	Limitobia 100,	100, 10	[823,	885
	inotira		$\begin{array}{c} 1250 \\ 1250 \end{array}$	basalis		- 1	860
insidi	inctus			bidentata	•••	782,	
			1250 75				890
Lecanopteris carnos		•••	103	congrua		759,	
Lecanora	•••	750		fascipenn			859
Lechria		1 001	830	geniculato			821
singularis		1, 691,	102	hirtipes	•••		837
Lecidea	•••			irrorata	7		822
Leea	•••	• • •	21	microceph			786
sambucina		==0	31	strigivena			
Leiponeura			795	Trentepol			832
breviven		5, 796,		vicaria	•••		859
gracilis	798	5, 796,		Limnobiorhynchus			775
Lema bifasciata	•••	••>	459	Limnodynastes	***	365,	
Lemna oligorrhiza	• • •	•••	70	affinis	0		370
Lentinus	•••	••	104	dorsalis		59, 365, 3	
Lenzites	•••	•••	104	0 . 1 .	[369, 3	70, 371,	
Leopardanthus scar			68	fletcheri			375
Lepidodendron		3 , 339		ornatus		75, 386,	
aust	rale	•••	339	peronii	365, 36	8, 371, 3	
Lepidosiren	•••		979			[374,	
Leptoconops 2	215, 224			salminii		5, 387, 1	
stygius	š	288,	310	tasmanicu	s		370
Leptogium			103	tasmanier	isis 35	8, 359, 3	365,
Leptopodus		730,	733			7, 368, 3	
Leptorhina			788			1, 374, 3	375,
Leptogium Leptopodus Leptorhina Leptospermum	44,	1184,	1204		38		
Lepyrodia stricta			320	Limnomya			838
Lerchea			18	Limnophila 20,	758, 75		
Lestignathus minor			740			[836,	838

xxiv. INDEX.

	PAGE		PAGE
Limnophila antiqua 8	849, 850, 851,	Lomaria pycnophylla	77
1	[891, 892	Lonchomera	19
aureola	839, 843, 891	Lonicera chinensis	98
Australasiæ	858, 892	Lophira	36
basalis	860	Lophoictinia isura	398
contempta	846	Lopholaimus antarctica	388
crux	837	Lophopetalum wallichii	40
disposita	843	Loranthus	1093
imbecilla	839, 844	formosus	60
imitatrix	847, 891	tetragonus	60
inordinata	851, 891		26, 731, 739
inornata	846	Loxonema	351
interventa	850, 891	Loxonia	21
Lawsonensis	856, 858,	Lucæna glauca	98
	[859, 891	Lucidota	1297
leucophæata	840, 891	Lucinæa	18
levidensis	855, 891	Luciola antennata	652
luctuosa	854, 856, 891	apicalis	652, 653
luteipennis	839, 846, 847	australis	652
metallica	853, 867	dejeani	652
obscuripenni		flavicollis	652, 653
ocellata	845, 891	lusitanica	645, 1298
recondita	839, 844	pudica	652
rostrifera	839, 846, 849	Luffa ægyptiaca	1062
vicaria ,	859	Lycæna attenuata	1066
Limnophyes	224	exilis	1067
Limonia	781	lysimon	1067
Lindsaya borneensis	76	Lychrosis afflictus	454
cultrata	76	luctuosus	454, 455
divergens	76	Lycium	20
lancea	76	Lygodium dichotomum	80
lanuginosa	76	flexuosum	27, 80
lobata	76	japonicum	27
orbiculata	76	microphyllum	
repens	76	scandens	27, 56
rigida	76		1028
scandens	76	lesueuri	1028
trichomanoide		Maba	21
Linociera	20	ebenus	29
Liodes angasi	1175	Macaranga	18
stilbiata	1192	tanarius	29
Liolepis	933	Macrocladus	34
belli	939	Macrones acicularis	452
Liparetrus discipennis	706	capito	452
Lippia	19	debilis	452
Lithosia chionora	1071	exilis	452
unicolor	1071	subclavatus	452
Litoria	371		219, 223
aurea	1061	Macrotæniopteris lata	348
Literanthes	18	3.5	0.1
Litsea	18	3.5	21
Lobivanellus lobatus	419	Mæsa	07
Lomaria	28	.,,	07
alpina	110	pumila	97

INDEX. XXV.

			PAGE [F	AGE
Mallotus			18	Meliornis Novæ-Ho	llandiæ		413
javanica			29	Meliphaga phrygia			413
philippinen			29	Melithreptus brevir			415
Malurus cyaneus			416	lunula		•••	415
Mandevillea suaveol		•••	98	Melochia	,	•••	19
Mangifera			20	Melodorum			19
C 1+ 1		•••	93	Melopsittacus undu	latus	•••	417
. 1.			93	Melothria	lauus	•••	20
NT 11 . 1 4 111 1		•••	100	Memecylon	18,	49 44	1 45
35	•••	•••	100	plebeiu	10,	40, 44	31
Nf	•••	•••	104			•••	
NT	•••	• • • •	44	umbella		•••	45
	•••	•••		Meniscium cuspidat	um.	•••	79
7.5 . 1	•••	• •	19	salicifol		• • •	79
3.5 1 '	• • •	•••	1062	triphyll	um		79
	•••	***	19	Menopoma alleghar			
		• • •	19	Menura superba			
		•••	38	Merismopteria Merops ornatus Merula vinitincta		•••	204
Mastodonsaurus			336	Merops ornatus		401,	1024
Matonia pectinata			75	Merula vinitincta	J	1296,	1297
Mecopus			16	Mesocalius palliolat	us		416
Medicago denticulat	a		1055	Mesoptera Metallesthes Metriocnemus			18
Medinilla	18,	30, 4	3, 45	Metallesthes			130
		,	45	Metriocnemus	215	. 224.	275
curtisii	•••		45	nitio	lulus	275.	276
javanensis			45	Metrosideros		-,,	44
magnifica			, 106		lifera.		108
speciosa			45	Mevenia erecta	all Clu	•••	99
Medusula			103	Meyenia erecta vogeliana	•••	•••	99
		•••	131	Mezoneurum brach			
Megapodius Layardi		•••	788		y car pun echinii		
Megarhina Megascolides	•••	•••	999		CHIHII		
		• •		Mezzettia		•••	19
35 1 3 1		• • • •	18	Michelia	•••	•••	22
	•••	•••	629	- champaca	•••	• • •	97
	•••	• • •	34	Micræca fascinans		***	407
acuminata		• • • •	320	Micrechites		• • •	19
genistifoli			1107	Micrechites Microferonia		• • •	738
leucadend			320	Adela	idæ	•••	739
linarifolia		• • •	108	Microstemon	• • •	•••	20
parviflora				Microtragus albidu	s		743
parvifolia			1259	arachi	ne		745
striata		318	, 320	assimi	lis	742,	745
thymifolia			108	macul	atus		744
uncinata			108	morme	on	743.	744
Melanippe teliferata	,		1158	stictic	us	•••	745
Melanodryas bicolor			408		rhousei		744
Melanorrhœa glabra			41	Microtropis		•,	34
usitata		•••	40	Milvus affinis	•••		398
	18,			Mimeta viridis			
malabath		27, 3		Mimulus	•••	*** ,	20
		21, 5	1049	Mimusone	•••	•••	$\frac{20}{20}$
Melia Azadirachta		107	1040	Mimusops Mirabilis jalapa Mirafra Horsfieldii	•••	***	
Azedarach	•••		1049	Minofro Horaticki	•••	•••	4 7 0
composita		•••	97	Mirafra Horsfieldii		•••	
Melictus ramiflorus		***	1001	Mirbelia grandiflor	J	• • •	108

INDEX.

	PAGI		PAGE
Mirbelia pungens	10	Morinda persicæfolia	91
reticulata			18
			87
	2	3.5 3 D 6.4	1077
Mitrasacme	2.00		
Mixophyes fasciolatus		jucunda	1077
	[373	lineata	1078
Modecca obtusa	58	sejuncta	1078
Molophilus 758, 8	803, 815, 810	servilis	1078, 1079
annulipes	809	venusta	1078
canus	\$1		43, 44
femoratus	80		205
flavonotatus	0.74	1 171	20.
			0.0
Froggatti			30
gracilis	80:		87
Helmsi	\$0		
longicornis	\$03, \$1-	Murex corneus	117, 118
lucidipennis	813	lignarius	118
montivagus	808		\$3
notatipennis			\$3
pervagatus	274	Managada	10
	0.70	36 1 1	
pulchripes	\$15		
ruficollis	\$0-		
translucens	\$11		
Momordica	20		407
balsamina	58	Myliobatis	652
Mongoma Monocarpia	\$31, \$35	Mylitta	105
Monocarpia	19	Myobatrachus gouldii	360
Monochoria vaginalis	7	Marahama anamiaidaa	747, 748
Monocrepidius australas		Kennelliana	748
			-10
Monoctenia 1136, 1139			
21 2	[1204, 1210		. 748
digglesaria	1205, 120		748
falernaria	1205, 120		1061
fraternaria	120	Myriophyllum	69, 70
himeroides	1.50.	indicum	70
obtusata	330- 330	Ar ·	19
obtusata ochripennata smerintharia subustaria vinaria	120	Myristica	29
smarintharia	1205 120	framans	102
enhuetaria	1205, 1200	fragrans sesquipedalia	
suotistaria rinaria	1005 100	Newmorkston	
Vinaria	1200, 120	Myrmephytum	18
Monogramme paradoxa	/	Myzantha garrula	397, 415
vinaria Monogramme paradoxa Monophlebus Crawfordi	123, 124	, Myzomela nigra	414
	[130	Naja	931
Monoporandra	3	Naravelia zevlanica	56
Monotaxis linifolia	100	Nardoa gilberti	188
Morchella	10.		\$88
Morelia 908, 909, 9	12, 913, 926		630
927 931 9	32, 936, 938	, Nearcha 11	39, 1151, 1152
		aridaria	1159 1155
₹1, ₹00, 8	051, 954, 955	, aridaria	1150, 1100
	961, 969	atyla	1153, 1157 1153, 1154
spilotes	961, 969 \$9 1	buffalaria	,
Morinda			1153, 1158
citrifolia	9-	paraptila	1153, 1156



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CONTENTS OF VOL. IV., PART 2.

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PAGE
Note on the Probable Occurrence of Aldrovanda vesiculosa in N.S.W.
By Baron von Mueller, K.C.M.G., M.D., Ph.D., F.R.S. (Plate
xvi) 197
Remarks on Fossils of Permo-Carboniferous Age, from North-Western
Australia, in the Macleay Museum. By R. Etheridge, Jun.
(Plate xvII.) 199
Diptera of Australia. Part VI.—The Chironomidæ. By FREDERICK
A. A. Skuse. (Plates XIXIV. and XIV. bis.) 215
Specimens of Plants collected at King George's Sound by the Rev. R.
Collie, F.L.S. By the Rev. Dr. Woolls, F.L.S 317
Bacteriological Notes. By Dr. OSCAR KATZ
(1) Note on the Bacillus of Leprosy 325
(2) On "Air-gas" for Bacteriological Work 328
An Attempt to Synchronise the Australian, South African, and Indian
Coal-Measures. Part 1.—The Australasian and New Zealand
Formations. By Professor Stephens, M.A., F.G.S 331
Observations on the Oviposition and Habits of certain Australian
Batrachians. By J. J. Fletcher, M.A., B.Sc 357
Notes on possible Means of Dispersal of Species, and on the Effects of
eating Pigeons nourished by the Seeds of Euphorbia Drummondii.
By C. T. Musson, F.L.S 388
A List of the Birds of the Mudgee District, with Notes on their
Habits. By J. D. Cox and A. G. Hamilton 395
Revision of the Genus Heteronyx, with Descriptions of New Species.
Part III. By the Rev. T. BLACKBURN, B.A 425
Notes on Australian Coleoptera, with Descriptions of New Species.
Part III. By the Rev. T. BLACKBURN, B.A 445
Note on the Origin of Kerosene Shale. By T. W. Edgeworth David,
B.A., F.G.S. (Plate xvIII.) 483
Studies in Australian Entomology. No. I.—Review of the Genus
Sarticus (Fam. Carabidæ). By Thomas G. Sloane 501
Experimental Researches with the Microbes of Chicken-cholera. By
Dr. OSCAR KATZ 513
Elections and Announcements 193, 314, 391
Donations 193, 314, 391
Notes and Exhibits 312, 388, 598

Note.—In the explanation of fig. 7 of Pl. XVII. (p. 214), for "Side view of another example, showing relative convexity of the ventral valve," read Dorsal view of another example, showing fractured ventral umbo, and decorticated dorsal valve.



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Lond., L.R.C.P, Edin 603
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Sidney Olliff, F.E.S 619
Note on the Fructification of Phlebopteris alethopteroides, Etheridge,
fil., from the Lower Mesozoic Beds of Queensland. By R.
ETHERIDGE, Jun 625
Note on the Bibliography of Lord Howe Island. By R. ETHERIDGE,
Jun
more Sovies. Pr. I. Manne Curpens, E.C.S.
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New Species of Lampyridæ, including a Notice of the Mt. Wilson
Fire-fly. By A. Sidney Olliff, F.E.S 643
Descriptions of two new Species of Australian Mollusca. By JAMES
C. Cox, M.D., F.L.S. (Plate xix., figs. 1-3) 658
Revision of the Genus Heteronyx, with Descriptions of new Species.
Part IV. By the Rev. T. BLACKBURN, B.A 661
Further Notes on Australian Coleoptera, with Descriptions of new
Genera and Species. Part IV. By the Rev. T. BLACKBURN, B.A. 707
Mollusca trawled off Merimbula, New South Wales. By J. Brazier,
F.L.S., &c 747
On the Further Structure of Conularia inornata, Dana, and Hyolithes
lanceolatus, Morris, sp. (=Theca lanceolata, Morris). By R.
Etheridge, Jun. (Plate xx.) 751
22222222222
Diptera of Australia Part vII.—The Tipulidæ brevipalpi. By
Diptera of Australia Part vII.—The Tipulidæ brevipalpi. By FREDERICK A. A. SKUSE. (Plates XXIXXIV.)
Diptera of Australia Part vII.—The Tipulidæ brevipalpi. By FREDERICK A. A. SKUSE. (Plates XXIXXIV.)
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Diptera of Australia Part VII.—The Tipulidæ brevipalpi. By FREDERICK A. A. SKUSE. (Plates XXIXXIV.)
Diptera of Australia Part VII.—The Tipulidæ brevipalpi. By FREDERICK A. A. SKUSE. (Plates XXIXXIV.)
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CONTENTS OF VOL. IV., PART 4.

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Descriptions of two Lizards of Genera new to Australian Herpetology.
By C. W. DE Vis, M.A 1034
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Note on the Breeding of the Glossy Ibis, Falcinellus igneus (Ibis falcinellus, Linn.). By K. H. Bennett, F.L.S 1059
Preliminary Notes on the Pharmacology of some new Poisonous Plants. By Thos. L. Bancroft, M.B., Edin 1061
On Queensland and other Australian Macro-Lepidoptera, with Localities, and Descriptions of new Species. By Thomas P. Lucas, M.R.C.S.E., L.S.A., L.R.C.P.Ed 1065
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Notes on Australian Coleoptera, with Descriptions of new Species. Part v. By the Rev. T. Blackburn, B.A 1247
The Examination of Kinos as an Aid in the Diagnosis of Eucalypts. Part II.—The Gummy Group. By J. H. Maiden, F.L.S., F.C.S. 1277
Studies in Australian Entomology. No. 11.—Six new Species of Carabidæ. By Thomas G. Sloane 1288
Notes on the Nidification of Merula vinitincta, Gld., and Ocydromus sylvestris, Scl. By A. J. North, F.L.S. (Title.) 1296
Notes on the Breeding of Sternula sinensis, Gmel., in Australia. By A. J. North, F.L.S. (Title.) 1296
Description of a New Australian Skink. By E. P. RAMSAY, LL.D., F.R.S.E., and J. DOUGLAS OGILBY, F.L.S. (Title.) 1296
Description of two new Skinks. By J. Douglas Ogilby, F.L.S. (Title.) 1296
Note on Atyphella lychnus. By A. Sidney Olliff, F.E.S 1297
Elections and Announcements 1031, 1056, 1101
Donations 1031, 1056, 1101
Notes and Exhibits 1052, 1100, 1297
President's Address
Office-Bearers and Council for 1890 1339
Title page Contents Index to Vel IV (Ond Con) List of Distance of Functs







